

COURSE OF STUDY

MISSOURI HIGH SCHOOLS

Containing

LIST OF LIBRARY BOOKS SUGGESTIONS FOR EQUIPPING
LABORATORIES; REQUIREMENTS FOR CLAS-
SIFICATION; STATE AID LAWS

ISSUED BY

State Department of Education

1916

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UNIVERSITY OF ILLINOIS



HOWARD A. GASS

State Superintendent of Public Schools

HUGH STEPHENS JEFFERSON CITY



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FOREWORD.

The use of a definite course of study has so long been the habit of the high schools of Missouri that explanations and definitions are now no longer necessary. For a number of years the state has prepared and distributed to the high schools of Missouri minimum requirements and outlines of courses of study that have enabled our schools to work harmoniously and definitely toward a common purpose in the preparation of students for life's duties.

The course is revised and brought up to date biennially. The present edition attempts to bring the courses for Missouri high schools in line with the latest and best educational thought. It offers for the benefit of all the result of observations and conclusions drawn by the high school inspectors and by the state superintendent. While an effort has been made to make this the latest word in high school recommendations it is by no means the last word. Changes for the better are constantly going on, and the earnest desire and constant effort is to profit by the best thought and latest experience of those who are investigating and developing educational problems along scientific lines.

It is hoped that this latest revision of the high school course of study marks a step in advance. Minimum courses are recommended, thus leaving large room for the individuality and the personality of organized forces in each of the public schools. Standards in education are as necessary as the compass and chart to the sailor of the seas. However, standards should be considered in the same light as the compass and chart; helpers and not hinderers. Standards in education give intelligent direction and purpose for work, as well as a goal to be reached. It is expected that the teacher will consult the course of study, which is his chart book, as frequently as does the sailor take soundings and consult sun and stars in order to determine his course and lead him safely to port.

The work of revising the present course of study has been done in the main by the high school inspectors, Messrs. M. G. Neale, P. P. Callaway and F. C. Irion. However,

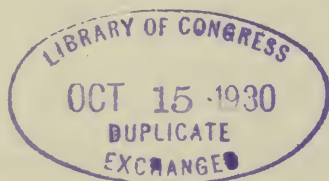
much valued assistance has been received from many sources, grateful acknowledgment of which is here made. The course of study is the consensus of opinion growing out of the past two years of experience in inspecting and classifying high schools, the study of many courses of study from other states and consultations with a large number of university and normal school teachers, city school superintendents and high school principals and teachers.

The co-operation of high school authorities in putting into practice requirements and recommendations has been very pleasing in the past. This course of study is issued with the hope that this spirit of earnest effort and co-operation will continue.

HOWARD A. GASS,

State Superintendent of Public Schools.

Jefferson City, July 1, 1916.



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HIGH SCHOOL COURSE OF STUDY.

INTRODUCTION.

In the present revision of the high school course only such changes have been made as seemed necessary to meet new demands on the high schools of the state. These new demands are due to the rapid growth of the high school population and to the desire on the part of school authorities to adapt their courses more and more to the varying needs and interests of this larger group of students. Some few things which have proved themselves hindrances in practice have been omitted. A few regulations and requirements which seemed necessary have been added, and some parts of the course which were frequently misunderstood have been made more definite.

The following are perhaps the most important changes and additions:

Major requirement I, concerning the *Preparation of Teachers*, has been made more definite, so that it should be easy for every teacher to determine for himself whether he is qualified to teach any one given subject in one of the three classes of approved high schools.

Under the topic *Courses of Study* several suggestive courses for individual high schools of the second and third class have been outlined. In connection with the discussion of each of the classes of high schools will be found a definite statement of the minimum amount of library and laboratory equipment required and an estimate of the cost of such equipment.

Following the courses of study are some suggestions concerning the keeping of *high school records*.

The courses in English, history, economics, sociology, German, French and music have been partially revised and the course in mechanical drawing has been revised throughout.

Additional courses have been outlined for one unit in general science; one-half unit in commercial law; one-half unit in advanced physiology, and one-half unit courses in

each of the following under advanced agriculture: animal husbandry, soils, field crops, and horticulture.

The lists of scientific apparatus have been revised so that prices quoted are more nearly like present market prices.

In the library lists the double and single starred books under each subject have been placed first and the total cost of these (taking one copy of each book) has been placed at the end of the starred books. This will help in making an estimate for required library equipment.

The attention of boards of education of districts maintaining two-year high schools is especially called to the combinations of good maps at moderate prices at the end of the library list for each history.

School officers often ask what should be done first in building an approved high school. To make the standards of approval more easily understood the requirements for classification have been stated in condensed form on the two pages following under two headings, respectively (1) major requirements, (2) minor requirements. Both major and minor requirements must be met before any school is approved.

MAJOR REQUIREMENTS.

I. Preparation of Teachers.

Every teacher should have completed at least two years of standard college work above a four year high school course. Below is a copy of Circular Letter No. 2, giving the minimum number of hours of college credit for high school teachers in the various subjects. These requirements are not sufficient in themselves, but presuppose at least two years of college work as suggested above.

1. In third class high schools the minimum requirement is fixed at five hours of college work for each subject taught.

2. In second class and first class high schools the minimum requirements in college hours have been placed as follows: First year Agriculture $7\frac{1}{2}$ hours; Advanced Agriculture 15 hours with a minimum of 5 hours in each half unit taught; General Science $17\frac{1}{2}$ hours in Physical and Biological Sciences with a major of not less than $7\frac{1}{2}$ in one Science and not less than 5 hours in each of two others; other Sciences $7\frac{1}{2}$ hours each; English 10 hours; History 10 hours; German 10 hours; Latin 10 hours, provided this is preceded by three units of High School Latin; Mathematics $7\frac{1}{2}$ hours; Sociology $7\frac{1}{2}$ hours; Economics $7\frac{1}{2}$ hours; Household Arts 15 hours; Manual Training 15 hours.

3. In the Commercial Department the teacher should be a graduate of a first class high school, or the equivalent, prior to the time of making preparation to teach this work. The teacher should also have graduated from a standard business course and should have had, in addition, courses in college English and Composition.

By college work is meant work taken in a standard institution of college rank by students who have met the minimum requirements for admission to college work, in classes containing only those students who have complied with these requirements,

II. Length of Term.

For a first or second class high school, a term of nine months must be maintained both in the grades and in the high school. For a third class high school a term of eight months must be maintained in the grades and in the high school.

III. Organization.

The course of study shall meet the minimum requirements hereinafter prescribed.

IV. Equipment.

The equipment shall include sufficient apparatus for individual laboratory work in the sciences taught and adequate reference books in the library to meet the needs of the pupils as determined by the size of the classes.

V. Nonpreparation Subjects.

Subjects requiring no outside preparation shall be given double periods daily to secure a full unit's credit.

VI. Quality of Work.

The character of instruction, habits of study and the general school spirit are strong factors in rating a school. The final test for approval is the quality of classroom work.

MINOR REQUIREMENTS.

I. Size of Classes.

No class should contain more than thirty pupils.

II. Buildings.

The location and construction of the building, the lighting, heating, and ventilation of the rooms, the nature of the lavatories, corridors, closets, water supply school furniture, and methods of cleaning shall be such as to insure hygienic conditions for both students and teachers.

III. Records.

A permanent system of records of attendance and credits shall be kept. Each school should install a cumulative system of records. The record should show the pupil's outside reading in English. A discussion of high school records will be found on page 25 of this manual.

IV. Number of Subjects.

Only the exceptionally strong pupil shall carry more than the equivalent of four subjects requiring outside preparation. At the most, not more than five per cent of the pupils should carry five subjects. These pupils should be the strong students and not those who have failed in certain subjects in previous years.

V. Standards of Entrance.

A certificate of graduation issued by the county superintendent must be required of all pupils for entrance, except those who have completed the eighth grade in a system over which the county superintendent has no jurisdiction. Students entering from other high schools shall receive the credit given to the school from which they enter as indicated in the Circular of High School

Credits* issued by the State Superintendent of Schools. In no case shall more credit be given than is recommended in this circular, without a thorough examination. No examination shall be given later than the first week of school and all questions and papers shall be kept on file as a part of the permanent record.

*For the convenience of the educational institutions of the State in classifying students from other schools, the State Superintendent issues a circular giving the standing of all high schools in Missouri. Copies are sent upon request.

SUGGESTIONS.

1. Only those subjects should be given which can be adequately equipped and satisfactorily taught. A definite course taught each year is more satisfactory than changes and alterations from year to year. The work in the grades should not be sacrificed to give a more extended high school course.

2. Courses should not be offered for the benefit of a very few pupils. It is poor management to maintain small classes in subjects such as advanced Latin and mathematics when the teaching force is limited and other classes are overcrowded.

3. Requirements for schools should not be confused with requirements for students within a school. Courses of study prescribed in this manual are minimum requirements for schools. Each student graduating from a four year course should be required to have eleven of his sixteen units from mathematics, English, history, language and science groups.

4. In the smaller high schools with few or no electives, the work in foreign language should be limited. There is question as to the advisability of offering any foreign language in a third class high school. In second class high schools and small first class high schools two units of one foreign language should meet the needs.

5. Many pupils on entering the high school are found to be deficient in penmanship, spelling and language. Where these deficiencies are marked, drill should be provided to overcome the weakness. No pupil should be graduated from the high school whose spelling, penmanship and language is noticeably weak. No credit should be given for such drill work.

6. The library should be carefully catalogued and managed. Teachers should be well acquainted with the reference work in their respective subjects. All library assignments should be definite and the problems to be investigated should be clearly stated. The library should be used daily and there should be a sufficient number of duplicate copies of the important books to make it usable at all times,

The use made of the library is a strong factor in determining the classification of high schools.

7. While it is necessary for students to keep some record of experiments and observations in the science laboratory, the notebooks are not an end within themselves. The notebooks should represent the student's own observations and conclusions in brief but complete statements. Notebooks should indicate the work and individuality of the pupil rather than that of the teacher.

8. It is the impression of the Department that many schools waste time in getting started in the fall, and do not keep up their stride the last month of the term. In some schools seniors put forth less effort than other classes and do little real work the last half of the year. Organization for September should be completed in the spring, and the work should be so apportioned that all classes continue regularly and maintain a high standard of work to the close of the term. Delay in starting gives the impression that time is not valued and laxity at the close makes it harder to keep up the standard the following year.

9. Equipment for all courses should be installed before the opening of school. Needed supplies should be ordered during the summer. It is not necessary to wait for the visit of the inspector to know what equipment is needed. The necessary equipment for all courses is clearly outlined in this manual. Credit can not be given for courses for which there is not adequate equipment.

10. Courses in manual training and household arts are recommended for all schools that can afford equipment and teachers for the work. Since many schools are adding these subjects, detailed outlines of the courses with complete lists of equipment will be found in this manual. Such courses should not be added unless well trained teachers can be secured and adequate equipment provided.

11. It is not only the right but the duty of every high school to meet as far as possible the manifest social needs of the local community. For example, a chemical laboratory in a mining center is incomplete without the means of doing some simple assaying, while the chemistry course in a farming community should include the chemistry of soils and other phases of the subject closely related to agriculture. The high school in a community from which few students go to

college should not stress foreign languages, nor should courses in bookkeeping, stenography and typewriting be offered in communities where there is no demand for bookkeepers and stenographers. School officers, superintendents, principals and teachers should carefully survey the educational needs and resources of their community and endeavor to adjust the high school course to meet these needs. Local needs and not outside influences should determine the content of the course of study.

12. The purpose of high school inspection is to improve school conditions. This is done by counseling with superintendents, teachers, and school boards and giving them constructive criticism. Besides the personal work of the inspectors, suggestions are made by letters, circulars, and courses of study. An inspector may visit a school for any one or all three of the following purposes: (1) to inspect and classify the school; (2) to help the board and superintendent solve special problems, and (3) to give general counsel and advice for the improvement of the school. Be free to write the State Superintendent when the Department can be of service.

COURSES OF STUDY.

Following are the required minimum courses of study for the three classes of high schools. If conditions warrant, boards of education may offer more than is prescribed, but at least the minimum requirements must be met before any school can be classified.

It is not necessary that every student take all the subjects offered in the high school of any class, but every student who is graduated from a third class high school must have completed a total of 8 units of work. A student graduated from a second class high school must have completed a total of 12 units of work, and a graduate of a first class high school must have completed a total of 16 units of work.

Of the total of 8 units of work required for graduation from a third class high school at least 2 units should be in English, 1 unit in mathematics, 1 unit in science and 1 unit in history.

Of the total of 12 units of work required for graduation from a second class high school at least 3 units should be in English, 1 unit in mathematics, one unit in science and 1 unit in history.

Of the total of 16 units of work required for graduation from a first class high school at least 3 units should be in English, 1 unit in mathematics, 1 unit in science, and 2 units in history.

A *unit* is defined as a subject pursued five periods a week for the entire school year, four units constituting a year's work. By *period* is meant not less than forty minutes devoted to actual teaching in subjects requiring preparation outside of the recitation or eighty minutes devoted to laboratory work. For drawing, manual training, household arts, bookkeeping, music and other subjects not requiring preparation outside of the recitation a *period* means eighty minutes devoted to classroom work. A nonpreparation subject reciting forty minutes each day for one year counts one-half unit credit. *In the sciences at least two of the five periods a week must consist of eighty minutes each, devoted to laboratory work.*

Third Class High Schools.*Two Years.*

English	2 units
Mathematics	1 unit
History	1 unit
Science	1 unit
Electives	3 units

Total 8 units

This course of study requires the full time of one teacher.

The electives may be two in a foreign language; one additional in science; one additional in history; one additional in mathematics; one-half in commercial geography; one-half in advanced physiology (to be taught in the last half of the second year).

The following sciences may be offered: agriculture, one unit; physical geography, one unit; zoology, one unit; botany, one unit; biology, one unit; advanced physiology, one-half unit. In every case where the high school receives special state aid the unit in agriculture must be taught, and it is strongly recommended that agriculture be taught in every high school. High schools not receiving special high school aid may however select any one of the above named sciences.

While a number of two-year high schools are teaching two units in science and such a course is permissible, it is recommended that such a course be not undertaken where one teacher teaches the whole high school course. The reasons for such recommendation are apparent. Two sciences in the course would be too much work for one teacher since 9 periods would be required four days a week, not to mention the extra work which must be done by the teacher outside of school hours to prepare for the laboratory work. Again, the expense for equipping for two sciences would be too great for many small communities.

The following history courses may be offered: ancient history, one unit; mediaeval and modern history, one unit; English history, one unit; American history and government, one unit; general history, one unit.

The following courses in mathematics may be offered: algebra, one, one and one-half, or two units; plane geometry, one unit; advanced arithmetic, one-half unit. The first year's work must be algebra in all cases.

Suggested Two-Year High School Courses.

First Year.		Second Year.	
English, 1 unit.		English, 1 unit.	
Algebra, 1 unit.		Algebra or Plane Geometry,	
Ancient History	} 1 unit.	1 unit.	
or		Mediaeval and Modern	} 1 unit.
English History		or	
Agriculture, 1 unit.		American History	
		Commercial Geography, $\frac{1}{2}$ unit.	
		Advanced Arithmetic, $\frac{1}{2}$ unit.	
		II.	
First Year.		Second Year.	
English, 1 unit.		English, 1 unit.	
Algebra, 1 unit.		Algebra or	
Ancient History	} 1 unit.	Plane Geometry, 1 unit.	
or		Agriculture, 1 unit.	
General History	} 1 unit.	Caesar	} 1 unit.
Beginning Latin		or	
or		2d German	
Beginning German			
		III.	
First Year.		Second Year.	
English, 1 unit.		English, 1 unit.	
Algebra, 1 unit.		Algebra or Plane Geometry,	
Agriculture, 1 unit.		1 unit.	
Beginning Latin	} 1 unit.	Ancient History	} 1 unit.
or		or	
Beginning German		General History	
		Caesar	} 1 unit.
		or	
		2d German	
		IV.	
First Year.		Second Year.	
English, 1 unit.		English, 1 unit.	
Algebra, 1 unit.		Algebra, $\frac{1}{2}$ unit.	
General History, 1 unit.		Adv. Arithmetic, $\frac{1}{2}$ unit.	
Agriculture, 1 unit.		American History, 1 unit.	
		Commercial Geography, $\frac{1}{2}$ unit.	
		Adv. Physiology, $\frac{1}{2}$ unit.	

If any foreign language is offered, at least two units must be given. Credit for one unit will be given for one year conditionally if this is necessary to introduce a language.

However, the one unit of the language to be introduced should not be taught in the senior year and under no condition should a pupil be allowed one unit credit in a language toward graduation.

Note—Other courses than the above could be worked out, but these are perhaps the best. While the particular needs of a community should determine the course taught, it is suggested that, all things being equal, that course should be selected which articulates easiest with a neighboring high school of higher classification which the students desiring further high school education generally attend.

Equipment for a Third Class High School.

a. Library.

1. Webster's New International Dictionary.
2. Abstract of Census (write Congressman). (Very desirable, but not absolutely required).
3. A good encyclopedia (very desirable but not absolutely required).
4. At least the double starred books in every subject taught which require reference reading.
5. Books for the outside reading in English for the first two years.

Books for high school library are listed according to subjects in the back of this course beginning on page 118.

b. Maps or Charts.

A chart or two or three adequate maps for every history taught should be secured. Recommended maps and charts will be found after the list of reference books for each history in the library list indicated above.

c. Laboratory Equipment.

At least the minimum equipment for every science taught as listed according to the various sciences under *Suggestions for Equipping Laboratories* beginning on page 92.

Note—For example. If suggested course No. I were adopted with ancient history and mediaeval and modern history, the minimum library and laboratory equipment would be:

1. Double starred books under English as well as the books for outside reading in English for two years.
2. Double starred books in ancient and in mediaeval and modern history.

3. Double starred books in agriculture.
4. Double starred books in commercial geography.
5. Webster's New International Dictionary.
6. A chart or at least two good maps for both ancient and mediaeval and modern history.
7. At least the minimum laboratory equipment for agriculture.

Where classes are large it is very desirable that duplicate copies of important reference books be secured. There should be at least one book to every four pupils in the important reference books.

The approximate cost of completely equipping a third class high school in library and maps and laboratory apparatus varies somewhat according to what course is adopted and according to the number of duplicate copies of reference books required, but should not fall much below \$200.00 in any case, nor go very much over \$250, provided agriculture is the only science in the course. This estimate also is exclusive of encyclopaedia. A good encyclopaedia would increase the above estimate by about \$100 in every case.

Second Class High Schools.

Three Years.

English	3 units
Mathematics	2 units
History	1 unit
Science	1 unit
Electives	5 units

Total 12 units

This course of study requires the full time of two teachers.

The teachers must be selected and the work assigned with due regard to the subjects each is prepared to teach. No teacher may have more than the equivalent of seven single periods of teaching daily. Less than this number is desirable. A school that employs only two teachers should not attempt more than twelve units.

The elective units may be one additional in mathematics; one or two additional in science; two or three in Latin; two or three in German; one-half in Civics; one-half in commercial geography; one-half in economics; one in pedagogy; one in household arts; one in manual training; one or one-half in bookkeeping.

Although three sciences are permissible in a second class high school, it is advisable in most cases, where only two teachers are employed, not to give more than two, or one science and a unit in household arts or in manual training.

In mathematics, at least one unit in algebra and one in plane geometry should be given.

If any foreign language is offered, at least two units must be given. (See further statement on this point under third class high schools.)

A number of courses for individual high schools can be worked out from the above. Among them the following are perhaps the most prevalent in three-year high schools, confined to two teachers and twelve units of work.

SUGGESTED THREE-YEAR HIGH SCHOOL COURSES.

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.
English, 1 unit. Algebra, 1 unit. Ancient History, 1 unit. Agriculture, 1 unit.	English, 1 unit. Plane Geometry, 1 unit. M. & M. History, 1 unit. { Beginning Latin } 1 unit. or { Beginning German }	English, 1 unit. { Solid Geometry, $\frac{1}{2}$ unit. Advanced Arithmetic, $\frac{1}{2}$ unit. } or { Advanced Algebra, $\frac{1}{2}$ unit. American History and Government, 1 unit. } Caesar or { 2nd German } 1 unit.
II.		
English, 1 unit. Algebra, 1 unit. Ancient History, 1 unit. Agriculture, 1 unit.	English, 1 unit. { Algebra, $\frac{1}{2}$ unit. Plane Geometry, $\frac{1}{2}$ unit. } M. & M. Hist. or Eng. Hist., 1 unit. Physical Geography, 1 unit.	English, 1 unit. Plane Geometry, $\frac{1}{2}$ unit. Solid Geometry or Advanced Arithmetic, $\frac{1}{2}$ unit. American History and Government, 1 unit. { Economics, $\frac{1}{2}$ unit. Commercial Geography, $\frac{1}{2}$ unit. } or { Civics, $\frac{1}{2}$ unit. Advanced Physiology, $\frac{1}{2}$ unit. }

III.

English, 1 unit. Algebra, 1 unit. Ancient History, 1 unit. Beginning Latin or Beginning German	English, 1 unit. { Algebra, $\frac{1}{2}$ unit. Plane Geometry, $\frac{1}{2}$ unit. M. & M. History, 1 unit. Caesar or 2nd German, 1 unit.	English, 1 unit. { Plane Geometry, $\frac{1}{2}$ unit. Solid Geometry, $\frac{1}{2}$ unit. or Advanced Arithmetic $\frac{1}{2}$ unit { Advanced Algebra, $\frac{1}{2}$ unit. American History and Government or Eng- lish History, 1 unit. Agriculture, 1 unit.
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IV.

English, 1 unit. Algebra, 1 unit. Ancient History, 1 unit. Agriculture, 1 unit.	English, 1 unit. Plane Geometry, 1 unit. { M. & M. History or English History Beginning Latin or Beginning German	English, 1 unit. Solid Geometry, $\frac{1}{2}$ unit. Advanced Arithmetic or Advanced Algebra, $\frac{1}{2}$ unit. Physics or Physical Geography, 1 unit. Caesar or 2nd German, 1 unit.
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V.

English, 1 unit. Algebra, 1 unit. Ancient History, 1 unit. Agriculture, 1 unit.	English, 1 unit. Plane Geometry, 1 unit. M. & M. History, 1 unit. Physical Geography, 1 unit.	English, 1 unit. Solid Geometry, $\frac{1}{2}$ unit. Advanced Arithmetic or Advanced Algebra, $\frac{1}{2}$ unit. American History and Government, 1 unit. Bookkeeping, 1 unit.
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Equipment for Second Class High School.*(Two teachers, 12 units.)***Library:**

1. One or two copies of Webster's New International Dictionary.
2. A first class encyclopedia.
3. All the double starred books and at least half of the single starred books in every subject taught which requires reference reading.
4. Duplicate copies of important reference books in all subjects. At least 1 book for every 4 pupils.

Maps:

A chart or at least three adequate maps (wall) for every history taught.

Laboratory Equipment:

At least minimum equipment for every science taught as suggested in this course of study.

For library equipment see page 118.

For laboratory equipment see page 92.

The total cost of equipping for library, maps and science equipment varies according to the number of sciences taught and number of duplicate copies of books.

Total cost of library, map and laboratory equipment when agriculture is the only science taught should not fall much below \$475. Total cost of library, map and laboratory equipment when two sciences, agriculture and physical geography, are taught, should not fall much below \$550.00. When agriculture and physics are in the course the total cost of equipping should not fall much below \$650.00. The above estimate includes \$100.00 for an encyclopaedia in every case.

First Class High Schools.*Four Years.*

English	3 units
Mathematics	2 units
History	2 units
Science	2 units
Electives	7 units

Total 16 units

This course of study requires the full time of at least three teachers. Two teachers cannot do four years of standard

work. The teachers must be selected and the work assigned with due regard to the subjects each is prepared to teach. Each teacher must have made special preparation for the work assigned. No teacher should have more than the equivalent of six single periods of teaching daily.

In a first class high school *every unit counted toward graduation must be approved.*

The maximum and minimum number of units that may be offered in the various subjects is shown in the table at the end of this division on page 24.

Equipment for a First Class High School.

a. Library:

1. 2 or 3 copies of Webster's New International Dictionary.
2. At least one first class encyclopedia.
3. All the double starred books in every subject taught which require reference reading.
4. At least all the single starred books or their equivalent in the same subjects.
5. Duplicate copies of important reference books in all subjects. One book to every 4 pupils is suggested.

b. **Maps:** Charts or adequate maps for every history taught.

c. Laboratory Equipment:

At least the minimum general equipment for every science taught, and a sufficiently large equipment for individual laboratory work.

It is impossible to estimate the cost of necessary equipment for all first class high schools owing to the great variety of courses taught. A high school, however, having three teachers and offering the minimum number of 16 units should not ask classification as a first class high school unless the minimum equipment in library, maps and laboratory is at least from \$750.00 to \$900.00. This estimate is made on a course of 16 units with only two of the following three sciences taught: agriculture, physical geography, physics. The introduction of an additional science or the introduction of domestic science or manual training would greatly increase the above estimate.

For library equipment see page 118.

For science equipment see page 92.

The maximum and minimum number of units that may be offered in the various subjects:

Subjects.	Maxi- mum.	Mini- mum.
English	4	3
Elementary Algebra	1½	1
Plane Geometry	1	1
Solid Geometry	½	½
Trigonometry	½	½
*Arithmetic (adv.)	½	½
*Algebra (adv.)	½	½
History	4	2
Civil Government	½	½
Latin	4	2
Greek	3	2
German	4	2
French	4	2
Spanish	3	2
Physics	2	1
Chemistry	2	1
General Biology	1	1
General Science	1	1
Zoology	2	1
Botany	2	1
**Physiology	1	½
Physical Geography	1	1
Agriculture	2	1
Music	1	½
Drawing	2	1
Manual Training	2	1
Mechanical Drawing	1	1
Household Arts	2	1
Economics	½	½
Sociology	½	½
Commercial Geography	½	½
Bookkeeping	1	½
Stenography and Typewriting	2	2
Pedagogy	1	1
Teacher-Training	3	3

*Arithmetic and advanced algebra must be preceded by elementary algebra and plane geometry in first and second class high schools.

**The unit course in physiology must be preceded by biology and zoology.

The half unit course in physiology may be taught in the second half of the second year in a third class high school and should not be offered below the third year in a first and second class high school.

HIGH SCHOOL RECORDS.

I. Permanent Final High School Record.

Special attention is called to requirement No. III, given under Minor Requirements on page 9.

A permanent system of records of attendance and credits must be kept. This should include a record of each student's outside reading in English. A good many high schools do not meet this requirement as they should. There is especially a laxity about keeping a permanent record of the outside readings in English. While this matter of records is given as a minor requirement it is really of the greatest importance and should receive the careful attention of superintendents and high school principals.

This department does not recommend any special system of permanent records. The following suggestions, however, may be of some assistance.

In a third class high school the matter of records is as important as in a three or four-year high school, and the matter of keeping a permanent record is comparatively simple because of the small number of pupils.

In a two-year high school with an enrollment of from 20 to 30 the permanent record is best kept perhaps in an ordinary business ledger. The record in this ledger should be kept as a record of the individual pupil rather than as a record by classes or years. A page or half a page according to the size of the ledger may be taken for each pupil. The following is a sketch of a half page of a ledger showing the individual record of a pupil:

Page 10			
Name—Harrison, William Henry.			
Parent (or Guardian)—Harrison, John Henry.			
Residence—(If a nonresident give address here.)			
Entered from—If a nonresident, place here the school attended last, e. g., Rural School, District No. 36, Jackson county. Presented certificate of graduation No. 8, dated April 3, 1915, from county superintendent.			
Date of entrance—Sept. 8, 1915. Age at entrance, 15 years, 4 months.			
<i>First Year.</i>		<i>Second Year.</i>	
No. of days attended, 140.		Same form as in first year.	
No. of times tardy, 3.			
Subject.	First half term.	Second half term.	Final grade.
English.....	70	80	75
Algebra.....	80	80	80
Anc. Hist....	60	68	64
Agriculture...	85	95	90
<p style="text-align: center; margin: 0;">OUTSIDE READINGS IN ENGLISH.</p> <p>Cooper—The Last of the Mohicans.</p> <p>Rice—Mrs. Wiggs of the Cabbage Patch.</p> <p>Poe—Selected Tales.</p> <p>Kipling—Kim.</p> <p>Wiggin—Rebecca of Sunny Brook Farm.</p>			
Graduated, May 10, 1917.			

If the pupil had dropped out of school after the first half of the first year this fact could have been recorded in the space given to outside readings and cause mentioned, e. g., dropped from register Jan. 5, 1916—moved; or, sickness, etc. Only semi-term grades should be recorded in this permanent record. This would show that a pupil has done at least half a unit of work in a given subject.

If a pupil should enter the second year after having completed the first year in some other approved high school, a record should be made in the space for first year above, showing the subjects accepted from the other school and grades in the same; if possible, also the readings in English. This might be done in red ink or some ink of different color than

the rest of the record. The various items of information, such as age, from what school, etc., should be gotten from the pupil on the day of entrance. As soon as his name has been entered on the ledger the name should also be put in the back of the ledger where a sufficient number of pages should be reserved for an alphabetical name index. After the name in the index should be written the number of the page of the ledger on which the record is found, e. g., under H in the name index should be written "Harrison, William Henry, page 10."

No attempt should be made to keep the individual pupil's records in alphabetical order on the pages of the ledger. This may be done each year at the opening of school with the newly entered pupils, but space could not well be reserved for pupils entering later. The name index in the back of the ledger will be practical enough for a third class high school with few students.

The above form is by no means intended to be a model to be copied but merely as an illustration of the idea suggested. By taking a little time each principal can no doubt improve the form both in its arrangement and in number of items to be recorded.

The matter of permanent record in the larger high schools becomes more difficult. In the smaller three and four-year high schools, no doubt a satisfactory ledger record can be worked out by the superintendent. If this is done it would be better, however, to keep a card system of name index to this ledger as this card system could be kept in absolute alphabetical order.

For high schools with large enrollment this department recommends some system of loose-leaf or card system of permanent records. In some of the high schools of the state systems of permanent cumulative records have been introduced. This would be the most complete and satisfactory system as it gives the educational history of the child from the time it enters school until graduation from the high school.

Various systems of loose-leaf records are on the market, both of high school records alone and of cumulative records. The two systems of loose-leaf records most generally found in the state are, perhaps, the systems published by the W. M. Welch Scientific Company, Chicago, Illinois, and the

School Record Publishing Company, Lawrence, Kansas. In some of the larger high schools the superintendents have worked out admirable systems of their own. In some of the high schools a card system of permanent high school records is used. A good card system is published by Shaw-Walker, Muskegon, Michigan. The Hugh Stephens Company, Jefferson City, Missouri, also publishes a card system of permanent high school record (this card is a modified form of the permanent high school record) suggested by the N. E. A. This record is compact and complete. Both sides of this card are used. Figure No. 1 and Figure No. 2 are facsimiles of the two sides of the card and are self-explanatory:

A Word of Caution.

While the card system of records is perhaps the most satisfactory from the standpoint of compactness and ease with which reference to it can be made, there is more or less danger of losing the cards. This is especially true if several persons are allowed to have access to the cards and if the recording is done by different persons at different times. The same danger, although in a lesser degree, is also found in a loose-leaf record system. In many high schools a double system of records is advisable, a ledger system for security and permanence and a card system or loose-leaf system for ready reference. The two systems should act as a check upon each other.

The care of the permanent record is another matter to which superintendents and principals should give special attention. In some of the smaller high schools, especially, the record is placed where everybody can have access to it. Frequently the record is found in the library shelf among the library books. The records should be kept in a place where no one but the superintendent, principal or some person especially entrusted with the care of same can have access to it. In many of the smaller towns a good plan would be to have the secretary of the board keep the record in a bank vault or some safe place other than the schoolhouse over summer.

Class Schedule.

The class schedule is another matter which receives little attention in many high schools. In every high school

PERMANENT-FINAL HIGH SCHOOL RECORD

Name

Parent or Guardian

Residence

Entered from

Date Entered

Age at Entrance

No. units accepted from other high schools (Indicate on record with red ink.)

SUBJECT	1st Year		2nd Year		3rd Year		4th Year		5th Year		SUBJECT	1st Year		2nd Year		3rd Year		4th Year		5th Year	
	1st	2nd	Cr.	1st	2nd	Cr.	1st	2nd	Cr.	1st		2nd	Cr.	1st	2nd	Cr.	1st	2nd	Cr.	1st	2nd	Cr.
English											Credits For'd										
German											Physiology										
Latin											Arithmetic										
Caesar											Algebra										
Cicero											Adv. Algebra										
Virgil											Plane Geometry										
French											Solid Geometry										
Ancient History											Trigonometry										
M. & M. History											Bookkeeping										
English History											Com. Geography										
Amer. History											Stenography										
Sociology											Typewriting										
Civics											Economics										
Agriculture											Manual Training										
Gen'l Science											Drawing										
Phys. Geography											Dom. Science										
Botany											Education I										
Physics											Education II										
Chemistry											Education III										
Credits For'd											Music										
Graduated																					
Total units										Dropped										Course	

Name: _____

FIRST YEAR

SECOND YEAR

THIRD YEAR

FOURTH YEAR

FIGURE NO. 2

there should be during the school year a class schedule card for every pupil. This card should be made out at the time of enrollment and no student should be allowed to enter any classes unless his class schedule is approved by superintendent or principal. Any changes in the daily program of a pupil during a semester or during the year should be carefully noted on his schedule card so that the card will show at all times where the pupil is. Such an arrangement, furthermore, makes it an easy matter to check the work carried by each high school pupil. Figure 3 is a suggested form of a class schedule.

CLASS SCHEDULE									
Name		Address		Parent's Name		Address		Class	
Age		Date		Course		School last Attended			
Periods	1	2	3	4	5	6	7		
Monday									
Tuesday									
Wednesday									
Thursday									
Friday									

Approved by _____

FIGURE NO. 3

II. Library Records.

While on the subject of records it is not out of order to call attention to the subject of classification and cataloguing of the high school library. In too many high schools no attempt is made to classify the books on the shelves or to keep a catalogued list of the books.

In a two-year high school with a comparatively small library no elaborate system of cataloguing is necessary, but no matter how small the library is, adequate shelf room should be provided for all the books and the books should be classified according to subjects and numbered and stamped as property of the high school. It is also suggested that besides numbering and stamping each book when placed in the library, the actual price which the district paid for the book be written in the same place where the number of the book is noted. This can easily be done from the invoices on receipt of the books. If this practice were followed it would facilitate the work of estimating the value of the library at any later time.

A record of the library books thus classified and numbered should be kept in a ledger. The books should be listed under the respective subjects, the number of the book given, year of purchase, publishers, author, and original cost of book.

In determining the estimated value of the library at any time, the books should not be valued according to their original cost, but due allowance should be made for the wear and tear and actual condition of the book. The original price merely makes it an easier matter to estimate the actual value and eliminates guesswork to a large extent.

In a separate book a daily record should be kept of books used by the students. In a great many high schools it is impossible to determine to what extent the library is used by the pupils because no permanent daily record is kept of books used during study periods or taken out for home study over night.

The above suggestions are made for high schools with small libraries. First class high schools with large libraries should by all means follow some good card system of library classification and a duly appointed librarian should have charge of the library. In many high schools responsible

students act as librarians during certain periods of the day. Under no circumstances should pupils be allowed to take books home without a proper record having been made.

III. Invoices of Science Apparatus.

Once a year, preferably at the close of the school year, an inventory should be taken of all science apparatus. The apparatus should be listed according to sciences. The exact number of pieces of apparatus should be given together with the value which is placed upon each piece. In estimating the value of any laboratory apparatus the original cost should not be taken as the actual value but due allowance should be made for deterioration through use and age.

The superintendent or principal should keep these invoices on file. Whenever new apparatus is secured it should be listed and the original cost as shown by the invoice should be recorded, since it will aid in making any later estimate.

The advantages of making the inventory at the end of the school year are as follows:

1. The apparatus will be classified and stored away properly over the vacation period.
2. The teacher can determine definitely where there are deficiencies and what will be needed for the next year. It is a poor policy to leave this matter until school opening in the fall. Superintendents and boards should make their estimates in the spring and should place orders early.

OUTLINE OF COURSES.

ENGLISH.

Four units may be offered.

THE AIMS OF HIGH SCHOOL ENGLISH.

The aims of high school English are well expressed in the following extract taken from "A Brief Summary of the Forthcoming Report of the National Joint Committee on the Reorganization of High School English."

"English comprises two subjects, composition and literature. These are complementary to each other, but by no means entirely identical, either in aim or in method.

The chief aim of composition teaching is to develop the power of effective communication of ideas in both speech and writing; it seeks to supply the pupil with an effective tool for use in both public and private life. In common with other studies, composition also develops power of observation, imagination and inference and makes substantial additions to one's stores of useful knowledge and one's range of ideas and interests. It involves guidance in gathering, selecting, organizing and presenting ideas for the sake of informing, persuading, entertaining, or inspiring others. It recognizes that good speech demands a sense for established idiom, distinct and natural articulation, correct pronunciation, and the use of an agreeable and well-managed voice; that good writing demands a large vocabulary, a clear and vigorous style, and firmness and flexibility in the construction of sentences and paragraphs; also correctness as to details of form, namely, a firm and legible handwriting, correct spelling, correctness of grammar and idiom, and observance of the ordinary rules for the use of capitals and punctuation.

The aims of literature teaching are to quicken the spirit and kindle the imagination of the pupil, open up to him the potential significance and beauty of life, and form in him the habit of turning to good books for companionship. It involves guidance in the gaining of a clear first impression of a book as a whole, the thoughtful consideration of parts in relation to the whole, and a vivid realization of the meaning of both the part and the whole in terms of the readers' own experience and imagination. It recognizes that good reading requires a definite understanding as to the purpose to be realized by the reading, whether only knowledge of essentials, intimate familiarity with details, or acquaintance with certain selected facts; the habit of careful observation, reflection, and organization; and in the case of oral rendering, an accurate and sympathetic interpretation of the meaning through well-controlled voice and manner."

Composition:

Continued, specific, and systematic instruction in grammar is essential. The working principles should be thoroughly fixed by constant application in composition. There should be continued drill for correction of the common errors of speech. The student should see clearly that all rules, definitions, and classifications grow out of the function of words in expressing thought.

Practice in composition, oral as well as written, should extend throughout the high school course. Subjects for this work may be taken from personal experience, general knowledge, studies other than English, and from the reading in literature, and should include narration, description, exposition, and argument. It is of vital importance that the subject be of interest to the student writing upon it. Set exercises should be required every week for the first three years and a carefully prepared paper at least once a month in the fourth year. Each student should be taught to criticise his own work and to correct his own errors. Due proportion of the class time should be devoted to the discussion of these exercises and to the explanation of the simpler rules for good writing. The exercises should then be rewritten with correction of errors.

Literature:

The study of literature should consist of reading and intensive study in class of selected works of representative authors. The aim in this intensive study is expressed above.

Besides the readings in class each pupil should read several literary productions outside of class. The object of such reading should be to give the student a pleasurable acquaintance with literature which can not be taken in class, and to encourage him to continue such reading voluntarily.

It is not necessary to have each member of a class read the same books in any year. The books should be selected with reference to the ability and past reading of the individual student.

A careful record of each student's reading should be filed each year with the permanent records of the schools.

There are various methods by which the teacher may determine whether a pupil has done the required outside reading conscientiously.

a. Oral report by the individual pupil during which the teacher can ask such questions which will convince her that the pupil has thoroughly read the work.

b. An occasional 10 or 15 minute written quiz.

c. Require the pupil to write a composition on some character or incident of the story.

In the course outlined by years given below are suggested lists of works both for class study and outside study.

Note I. The rhetoric should be completed in the second year of a two or three year high school course. The amount of reading may be proportionately reduced.

Note II. In a three-year high school course, the rhetoric having been completed in the second year, history of English literature should receive its proportion (one-fifth) of the time in the third year.

Note III. Figures following the different subjects indicate the proportion of time to be given to each subject. *They do not mean that in each week so many days are to be given to grammar, so many days to composition, and so many to literature.* It is perhaps better to give consecutive class periods to one subject until a definite portion is mastered, and then proceed similarly with another. Especially harmful is the reading of a classic in small portions at a time with an interval of one or two days between the readings.

FIRST YEAR.

Grammar ($\frac{2}{5}$) and Composition ($\frac{1}{5}$):

Grammar should be thoroughly mastered. Composition, both oral and written—at least one short narrative theme a week on subjects of interest, and frequent exercises in oral composition. Written work should be carefully criticised and re-written. Special attention to spelling, punctuation, and letter writing.

Literature ($\frac{2}{5}$):

FOR STUDY AND PRACTICE (select four):

Arnold, *Sohrab and Rustum*.
 Hawthorne, *Tales of the White Hills*.
 Irving, *Sketch Book* (selections).
 Longfellow, *Tales of a Wayside Inn*.
 Lowell, *The Vision of Sir Launfal*.
 Poe, *The Gold Bug*.
 Scott, *The Lady of the Lake*.
 Stevenson, *Treasure Island*.
 Whittier, *Snow Bound*.
 Tennyson, *Enoch Arden*.
 Dickens, *Christmas Carol*.
 Macaulay, *Lays of Ancient Rome*.

FOR OUTSIDE READING.

(Select any group of the selections below in such a way that the sum of the points which are given after every selection is equal to twenty.)

Bible, *Old Testament Stories*. (2)
 Cooper, *The Last of the Mohicans*. (4)
 Dickens, *The Tale of Two Cities*. (5)
 Kipling, *Kim*. (4)
 Mark Twain, *Huckleberry Finn*. (5)
 Poe, *Selected Tales*. (3)
 Rice, *Mrs. Wiggs of the Cabbage Patch*. (3)
 Stevenson, *Kidnapped*. (4)
 Wiggin, *Rebecca of Sunnybrook Farm*. (3)

SECOND YEAR.

Composition and Rhetoric ($\frac{1}{2}$):

The principles of rhetoric should be thoroughly mastered in the second and third years. Use half of some good text during this year. Principles should be developed and illustrated from composition and literature. The literature will afford abundant material for teaching viewpoint and plan in description; also setting, plot, and the development and delineation of character in narration.

Literature ($\frac{1}{2}$):

FOR STUDY AND PRACTICE (select four):

Coleridge, *The Ancient Mariner*.

Goldsmith, *The Deserted Village*.

Palgrave, *Golden Treasury III and IV*.

Scott, *Ivanhoe*.

Shakespeare, *The Merchant of Venice*.

Tennyson, *Gareth and Lynette, and the simpler idylls*.

Thoreau, *The Succession of Forest Trees*.

Webster, *The First Bunker Hill Oration, and other addresses*.

FOR OUTSIDE READING:

(Select any group of the selections below in such a way that the sum of the points which are given after each selection is equal to twenty.)

Bible, *Esther, Ruth*. (2)

Blackmore, *Lorna Doone*. (4)

Bunyan, *Pilgrim's Progress*. (4)

Dickens, *David Copperfield*. (5)

Hale, *The Man Without a Country*. (2)

Kipling, *Captains Courageous*. (4)

Mark Twain, *Prince and Pauper*. (5)

Scott, *Kenilworth*. (5)

Warner, *Being a Boy*. (3)

THIRD YEAR.

Composition and Rhetoric ($\frac{2}{5}$):

Principles of rhetoric should be completed; and considerable ability acquired in analysis, in outlining, and in organization of complex material. A weekly theme is desirable, but a biweekly theme corrected and discussed is better than a weekly theme that the teacher does not read. Every student should be required to write and memorize for public delivery a debate and a short oration.

Literature ($\frac{3}{5}$):

FOR STUDY AND PRACTICE (select five):

Addison, *The Sir Roger DeCoverly Papers*.

Browning, *The Pied Piper, and Shorter Poems*.

Eliot, *Silas Marner*.
 Emerson, *Essays*.
 Lincoln, *Selections from Speeches and Letters*.
 Macaulay, *Life of Johnson*.
 Palgrave, *Golden Treasury II*.
 Shakespeare, *Julius Caesar*.
 Stevenson, *Travels with a Donkey*.

FOR OUTSIDE READING:

(Select any group of the selections below in such a way that the sum of the points which are given after each selection is equal to twenty.)

Bible, *Genesis, Joshua, Judges*. (3)
 Dana, *Two Years Before the Mast*. (4)
 Goldsmith, *The Vicar of Wakefield*. (4)
 Hawthorne, *The House of Seven Gables*. (4)
 Hughes, *Tom Brown's School Days*. (4)
 Scott, *Quentin Durward*. (5)
 Seton, *The Trail of the Sandhill Stag*. (2)
 Shakespeare, *A Midsummer Night's Dream*. (3)
 Stevenson, *Dr. Jekyll and Mr. Hyde*. (3)

FOURTH YEAR.

Composition ($\frac{1}{5}$):

Interest in composition should be sustained. The class should be held strictly responsible for the principles of grammar necessary for proper interpretation of the literature, and for the correct use of good English. Argumentation should include briefing, the clear statement of a question, the development of proof, summaries of proof, etc. Every possible opportunity should be given for original papers to be read and to be delivered from memory.

History of Literature ($\frac{1}{5}$):

Use some good text on the history of English literature, to give a general view of the subject. The text should be concise and brief so that most of the time may be devoted to the literature itself.

Literature ($\frac{3}{5}$):

FOR STUDY AND PRACTICE (select five):

Burke, *Speech on Conciliation*.
 Carlyle, *Essay on Burns*.
 DeQuincey, *English Mail Coach*.
 Milton, *L'Allegro and Il Penseroso*.
 Palgrave, *Golden Treasury I*.
 Ruskin, *Sesame and Lilies*.
 Shakespeare, *Macbeth*.
 Tennyson, *The Idylls of the King*.
 Washington, *Farewell Address*.

FOR OUTSIDE READING:

(Select any group of the selections below in such a way that the sum of the points which are given after each selection is equal to twenty.)

- Austen, *Pride and Prejudice*. (3)
 Eggleston, *The Hoosier Schoolmaster*. (2)
 Eliot, *Romola*. (5)
 Holmes, *The Autocrat of the Breakfast Table*. (4)
 Kingsley, *Westward Ho!* (5)
 Parkman, *The Oregon Trail*. (4)
 Shakespeare, *As You Like It*. (3)
 Wright, *The Shepherd of the Hills*. (3)
 Van Dyke, *The Blue Flower*. (2)

For library equipment see pages 119-126.

COLLEGE ENTRANCE REQUIREMENTS IN ENGLISH:

Below is appended the list of College Entrance Requirements in English for 1915-1919. Should more masterpieces either for critical study or for outside reading be needed, they should be chosen from this list. Moreover, the teacher should feel free to substitute pieces from this list for those in the outline above. The book substituted should be of equal rank and of similar literary qualities.

FOR READING.

The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.

Group I. Classics in Translation. The *Old Testament*, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the *Odyssey*, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the *Iliad*, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's *Aeneid*. The *Odyssey*, *Iliad*, and *Aeneid* should be read in English translations of recognized literary excellence.

For any selection from this group a selection from any other group may be substituted.

Group II. Shakespeare. *Midsummer Night's Dream*, *Merchant of Venice*, *As You Like It*, *Twelfth Night*, *The Tempest*, *Romeo and Juliet*, *King John*, *Richard II*, *Richard III*, *Henry V*, and *Coriolanus*; and, if not chosen for study, *Julius Caesar*, *Macbeth*, and *Hamlet*.

Group III. Prose Fiction. Malory: *Morte d' Arthur* (about 100 pages). Bunyan: *Pilgrim's Progress*, Part I. Swift: *Gulliver's Travels* (voyages to Lilliput and to Brobdingnag). Defoe: *Robinson Crusoe*, Part I. Goldsmith: *Vicar of Wakefield*. Frances Burney: *Evelina*. Scott's novels: any one. Jane Austen's novels: any one. Maria Edgeworth: *Castle Rackrent*, or *The Absentee*. Dickens's novels: any one. Thackeray's novels: any one. George Eliot's novels: any one. Mrs. Gaskell: *Cranford*. Kingsley: *Westward Ho!* or *Hereward, the Wake*. Reade: *The Cloister and the Hearth*. Blackmore: *Lorna Doone*. Hughes: *Tom Brown's Schooldays*. Stevenson: *Treasure*

Island, or *Kidnapped*, or *Master of Ballantrae*. Cooper's novels: any one. Poe: selected tales. Hawthorne: *The House of Seven Gables*, or *Twice Told Tales*, or *Mosses from an Old Manse*. A collection of short stories by various standard writers.

Group IV. Essays, biography, etc. Addison and Steele: *The Sir Roger de Coverly Papers*, or selections from the *Tatler* and *Spectator* (about 200 pages). Boswell: selections from the *Life of Johnson* (about 200 pages). Franklin: *Autobiography*. Irving: selections from *The Sketch Book* (about 200 pages), or *Life of Goldsmith*. Southey: *Life of Nelson*. Lamb: selections from the *Essays of Elia* (about 100 pages). Lockhart: selections from the *Life of Scott* (about 200 pages). Thackeray: lectures on Swift, Addison, and Steele in the *English Humorists*. Macaulay: any one of the following essays—*Lord Clive*, *Warren Hastings*, *Milton*, *Addison*, *Goldsmith*, *Frederick the Great*, *Madame d'Arblay*. Trevelyan: selections from the *Life of Macaulay* (about 200 pages). Ruskin: *Sesame and Lilies*, or selections (about 150 pages). Dana: *Two Years Before the Mast*. Lincoln: selections, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, the Letter to Horace Greeley, together with a brief memoir or estimate of Lincoln. Parkman: *The Oregon Trail*. Thoreau: *Walden*. Lowell: selected essays (about 150 pages). Holmes: *The Autocrat of the Breakfast Table*. Stevenson: *An Inland Voyage and Travels with a Donkey*. Huxley: *Autobiography* and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*. A collection of essays by Bacon, Lamb, De Quincey, Hazlitt, Emerson, and later writers. A collection of letters by various standard writers.

Group V. Poetry. Palgrave's *Golden Treasury* (First Series): Books II and III, with special attention to Dryden, Collins, Gray, Cowper, and Burns. Palgrave's *Golden Treasury* (First Series), Book IV, with special attention to Wordsworth, Keats, and Shelley (if not chosen for class study). Goldsmith: *The Traveller* and *The Deserted Village*. Pope: *The Rape of the Lock*. A collection of English and Scottish ballads, as, for example, some Robin Hood ballads, *The Battle of Otterburn*, *King Estmere*, *Young Beichan*, *Bewick and Grahame*, *Sir Patrick Spens*, and a selection from later ballads. Coleridge: *The Ancient Mariner*, *Christabel*, and *Kubla Khan*. Byron: *Childe Harold*, *Canto III or IV*, and *The Prisoner of Chillon*. Scott: *The Lady of the Lake*, or *Marmion*. Macaulay: *The Lays of Ancient Rome*, *The Battle of Naseby*, *The Armada*, *Ivry*. Tennyson: *The Princess*, or *Gareth and Lynette*, *Lancelot and Elaine*, and *Passing of Arthur*. Browning: *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *Herie Riel Pheidippides*, *My Last Duchess*, *Up at a Villa—Down in the City*, *The Italian in England*, *The Patriot*, *The Pied Piper*, *De Gustibus—*, *Instans Tyrannus*. Arnold: *Sohrab and Rustum*, and *The Forsaken Merman*. Selections from American poetry, with special attention to Poe, Lowell, Longfellow, and Whittier.

FOR STUDY.

This part of the requirements is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama. Shakespeare: *Julius Caesar*, *Macbeth*, *Hamlet*.

Group II. Poetry. Milton: *L'Allegro*, *Il Penseroso*, and either *Comus* or *Lycidas*. Tennyson: *The Coming of Arthur*, *The Holy Grail*, and *The Passing of Arthur*. The selections from Wordsworth, Keats, and Shelley in Book IV of Palgrave's *Golden Treasury* (First Series).

Group III. Oratory. Burke: *Speech on Conciliation with America*. Macaulay's *Speech on Copyright* and Lincoln's *Speech at Cooper Union*. Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*.

Group IV. Essays. Carlyle: *Essay on Burns*, with a selection from Burns's Poems. Macaulay: *Life of Johnson*. Emerson: *Essay on Manners*.

MATHEMATICS.

Four units may be offered.

The following suggestions are offered for arrangement of courses:

(a) For two year high schools three arrangements are possible: (1) one year of algebra followed by a year of plane geometry, (2) a year and a half of algebra followed by one-half year of advanced arithmetic, or (3) two years of algebra.

Note—*In a three or four-year high school only a year and a half of elementary algebra will be accredited. The first year's work must be algebra in all cases.*

(b) For three-year high schools the following arrangements are possible: (1) a year and a half of algebra, and one year of plane geometry followed by advanced arithmetic, advanced algebra or solid geometry, (2) one year of algebra, one year of plane geometry, and another half year of algebra followed by advanced arithmetic, advanced algebra or solid geometry.

(c) For four-year high schools several arrangements are possible. See the table of maximum and minimum number of units following the outline of the course of study for first class high schools, page 24.

In the matter of course content the following suggestions are offered:

ELEMENTARY ALGEBRA.

One unit.

This unit in algebra should include the topics usually presented up to and including the solution of quadratic equations by factoring.

To cover this amount of subject matter requires certain modifications and omissions as follows:

a. The four fundamental operations may be carried out only on arithmetical numbers and on algebraic expressions not longer than trinomials.

b. Factoring should be limited to the standard type forms.

c. Complicated complex fractions may be omitted. The interpretation of the rules of arithmetic in algebraic symbols with a review of arithmetical problems should be stressed.

d. Square root should be limited to square roots of arithmetical numbers, monomials, and the squares of binomials, and cube root may be limited to arithmetical numbers and monomials. This should be accompanied by explicit numerical calculations, applications to mensuration, and if possible, the construction and use of small tables of squares and square roots.

e. Exponents may be limited to positive integral exponents below 10, but should include such illustrations as arise in the mensuration formulas of geometry.

f. *The chief aim in the teaching of one unit of algebra should be the thorough mastery of the linear equation in one unknown and a*

thorough application of it in the solution of practical problems. As great a variety of practical problems of the usual types as is possible and practical problems of arithmetic by algebraic methods should be given.

g. After the linear equation in one unknown is mastered, simultaneous linear equations in two unknowns should be studied. Limit the solution to one method. Apply in a variety of practical problems.

h. Quadratic equations may be limited to the solution of numerical examples by factoring, but should include numerous problems stated in English, and such applications as geometry affords, including the Pythagorean theorem, or those dependent on the falling body formulas.

i. Graphical processes should begin with graphical representations of quantities by straight lines, circles, or other areas, as in representations of statistics. They should include, also, the representation of negative quantities, with such illustrations as are afforded by the thermometer. Special emphasis should be laid on graphing in the study of linear equations of two unknown quantities.

ELEMENTARY ALGEBRA.

One and one-half units.

Complete the elements of algebra, including the above and also the following: the solution of quadratic equations by completing the square, with emphasis only on those examples where the roots are real; simultaneous quadratics only in a few simple examples that can readily be illustrated by graphs, with emphasis only on the bases where one equation is linear; the binomial theorem for positive integral exponents, with emphasis only on the cases where the exponent is less than five; ratio and proportion only in the sense of fractional equations, including, however, graphical representation of two variable quantities, one of which is proportional to the other; arithmetic and geometric progression in the usual sense; practical use of logarithms restricted to the base 10, and emphasizing the use of a table; fractional and negative exponents with special reference to logarithms, accompanied, if possible, by the practical use of the slide rule; and those practical problems in which quantities raised to fractional powers occur.

ELEMENTARY ALGEBRA.

Two units.

Two-year high schools may give only algebra and spend the two years on the subject. In such cases a strong high school text should be selected and the work of the text should be completed. More work than is outlined above can be done in the two years. A more extended study of imaginary quantities, the binomial theorem, and quadratic equations with one and two unknowns can be given. Graphical work on quadratics should be emphasized. Roots of

equations and their relations thoroughly mastered. Some work on progressions and variations can be given. Study the function. Make graphs of problems in variation.

PLANE GEOMETRY.

One unit.

A unit in geometry should embrace all that is usually found in a modern text on this subject, with the omissions of the theory of limits, the incommensurable cases, maxima and minima, and a few others which have neither a practical nor an educational value. Special stress should be laid on the more basic theorems and these should be considered in groups. Logical reasoning, accurate expression and independence of thought should be emphasized at the outset. With a thorough conception of the axioms and definitions as the bases for geometrical reasoning, the pupils, with wise direction by the teacher, should be able to make much of the work original with but little, if any, use of the text. The committing of demonstrations to memory has no educational value, and therefore every precaution should be taken to avoid this common mistake. Whenever possible, applications of arithmetic and algebra to geometry and of geometry to arithmetic and algebra should be made. Wherever manual training is taught, geometry should be correlated with it as much as possible. The work should be made as concrete as possible so that every phase of the subject may be understood in its practical relations. Original demonstrations should form an important part of the work. It is recommended that informal proofs be accepted for some of the most obvious theorems, and that the notion of a strictly logical proof be developed gradually as the student can be led to see the need for such proof. A specially favorable opportunity to make geometry seem of real value to the student consists in the application of the theorems on similar triangles to the graphical solution of triangles by drawing them to scale and measuring the unknown parts with ruler and protractor. In this connection, the simplest notions of trigonometry may be introduced with profit.

ADVANCED ARITHMETIC.

One-half unit.

a. *Advanced arithmetic may be taught in the second year of a two-year high school. It will not be approved in a three or four-year high school unless it is given after the completion of the elementary courses in algebra and plane geometry.*

b. *Some advanced text on arithmetic should be used. A regular eighth grade text is not satisfactory, nor is the average commercial arithmetic suitable for this course.*

This work in arithmetic should not be divorced from algebra and geometry. Rather the use of principles of algebra and geometry should be encouraged, so that the whole point of view in this course

can be made more mature and more general than the elementary course in arithmetic in the graded school. On the other hand, algebraic and geometric work should be done only as it is really valuable. Extended variety of topics is by no means so desirable as a careful study of the meaning of the simpler and more fundamental processes of arithmetic together with application to problems drawn as widely as possible from geometry, physics, mensuration, business and other subjects with which the student is already familiar.

Topics deserving special attention are the following:

The fundamental processes on fractions should be accompanied by a statement of the general principles in algebraic form. Percentage should be clearly shown to be a special case of fractions, and its general principles should be presented in algebraic formulation.

Square root should be accompanied by practical computation emphasizing its applications in mensuration; and the student should be encouraged to use tables of squares, square roots, cubes and cube roots, if such tables are available.

Practical problems that involve the use of actual plans of houses and diagrams of machinery, which can be obtained freely from firms of architects and firms of machinery manufacturers, should be used, if possible.

Business forms should include forms of checks, notes, drafts, etc. Special attention is called to the value of a study of interest tables, insurance rate books, tables of freight rates, postal rates, etc.

For reference, as a source of material for problems, and on account of useful tables they contain, the library should be supplied with at least one standard engineers' handbook, and with such a book as the New York World Almanac. Some such material is available also in large encyclopedias.

The high school should own also at least one standard slide rule of not less than 8 inches in length, and a protractor. The laboratory of physics may supply such instruments as the vernier caliper, whose use should be made clear in this course, even if the student has had no laboratory work.

An effort should be made to explain other mathematical instruments in commercial use, such as water meters, light meters, cyclometers, adding machines; and samples of such devices should be added to the equipment of the school as opportunity affords.

ADVANCED ALGEBRA.

One-half unit.

This half unit may not be given in a two-year high school and will not be approved in a three or four-year high school unless it is given after the completion of the elementary course in algebra and plane geometry.

The course should follow the general spirit of the courses outlined above, but it should cover the more technical phases of algebra omitted in what precedes. Thus factoring should be extended to

such forms as the sum of the n th powers of two quantities ($X_n + Y_n$), the factor theorem and the remainder theorem.

The technique of the four fundamental operations and fractions should be improved by considerable drill work, using polynomials of greater length, and literal coefficients. The work in linear equations should include three equations in three unknowns; the work in quadratic equations should include the properties of the roots of quadratics and the solution of the simpler cases of simultaneous quadratics.

The work in exponents should cover operations with literal exponents and the theory of logarithms to any base. The course should cover also the solution of equations of higher degree by graphical methods, and the general case of the binomial theorem for positive integral exponents, together with other simple cases of algebraic induction.

Any standard high school text not intended principally for first year work will include these topics, but scarcely any omission can be made in the usual book if two units are to be approved.

SOLID GEOMETRY.

One-half unit.

The work in solid geometry should cover a full half year's work. The logical side of the work may be somewhat subordinated, thoroughly emphasizing the question of space intuition and the more important mensuration formulas. The student's space conception may well be aided by the construction and study of models, and by the experimental verification of formulas.

TRIGONOMETRY.

One-half unit.

This is supposed to cover a half year's work. The ability to solve a right triangle and any oblique triangle by dividing it into right triangles without using logarithms should be emphasized above everything else. The ability to read tables, to interpolate properly, and the ability to use tables of any kind that may be presented, is very important. The knowledge of logarithms and logarithmic methods of solution is of importance only secondary to the things mentioned above. Such other topics, as the formulas involving two angles, should be treated at least briefly.

For library equipment, see page 126.

HISTORY.

Four units may be offered.

A study of history should develop in the student a knowledge of historical unity and growth. To accomplish this, chronological sequence should be an important factor in determining the arrangement of courses. However, in all the better grade and rural schools, children are given some acquaintance with general history through story and biography, and it is not essential that every high school student shall pursue courses in all fields. Suggestions are accordingly for four years, three years, and two years of history. The last named plan, while not recommended for first and second class high schools, is all that may be given in two year high schools.

A. *Four year course:*

(1) Ancient history, (2) mediaeval and modern history, (3) English history, (4) American history. The fourth year may also consist of half a unit of American history followed by half a unit of civics.

B. *Three year courses:*

a. (1) Ancient history, (2) mediaeval and modern history, (3) American or English history. In the third year a half unit of American history may be taught followed by a half unit of civics.

b. (1) European history I (including history of Greece and Rome and the greater part of mediaeval history), (2) European history II (latter part of mediaeval and modern history with special stress on history of England), (3) American history.

C. *Two year courses:*

a. (1) Ancient history, (2) Mediaeval and modern history.

b. (1) European history I, (2) European history II.

c. (1) General history, (2) American history.

d. (1) Ancient, (2) English or American history.

Reference reading. The use of the reference library in history should receive careful attention on the part of the teachers. Much of the so-called reference reading as conducted in many schools now is of comparatively little value.

1. There should be duplicate copies of important reference books in every history course. At least one book for every four pupils is recommended.

2. In every problem or topic assigned the subject matter of the text should be supplemented by definite page assignments in the library reference books.

In addition to this, reports should be required of the individual pupils on special phases of the problem or topic assigned.

ANCIENT HISTORY.

The completion of a careful and thorough course of study extending over one entire school year in ancient Oriental, Greek, and Roman history. A standard high school textbook should be used.

MEDIAEVAL AND MODERN HISTORY.

A year's study of the history of the European nations and their development and institutions from the period of the Germanic invasions to the close of the nineteenth century. The course should be based on a standard high school textbook.

ENGLISH HISTORY.

A thorough study of English political, governmental, economic and social history extending through one full year and based on any standard textbook.

AMERICAN HISTORY.

This course should embrace a year of advanced work in American political, social and institutional history with special reference to the period since 1760. A standard high school textbook should be used. The American history should follow the other history work done by the student.

EUROPEAN HISTORY I.

The unit in European History I should include the history of the Orient, of Greece and Rome and mediaeval history, probably to the close of the period of the Reformation. To cover all this ground will require a departure from the traditional treatment of that part commonly known as ancient history. Less stress should be given to and less time spent on the political side of ancient history and the study should stress mainly those matters which had the greatest bearing and influence on subsequent history.

EUROPEAN HISTORY II.

This unit should complete mediaeval history from the point where it is left in European History I. The bulk of the work therefore is in what is commonly called modern history. In this part special stress should be laid on the history of England and the unit should include contemporary history.

Note—What is known as the three-year course in history—two units in European History, followed by a unit in American history—has been introduced in several four-year high schools in the state. The three units of history are then followed by two of the following half-units in the fourth year: civics, economics, sociology. Several of the larger book companies have now books on the market covering approximately the ground for either the first unit or second unit or both units in European History as outlined above.

GENERAL HISTORY.

The unit in General History may be given only in third class high schools when followed by American History. The work should be based on some one of the standard high school texts.

For library equipment see pages 127-141.

AMERICAN (CIVIL) GOVERNMENT.

One-half unit may be offered.

Systematic instruction in American government should be postponed to the two last years of the course. There is a distinct advantage in this plan. If given in the earlier years the work would be largely a review of what had been done in the last year of the elementary school. Still more important is the consideration that the junior and senior is a much better subject for such instruction than are students in the first and second years. He will be much more appreciative of the spirit and content of the course.

American government should be given as a distinct course and not as part of the work in American history. History, however, is so essential to good results in the teaching of government that credit will not be given for work in American government unless it is preceded by at least one-half year's work in American history. The best plan is to offer American government in the second half of the senior year following American history in the first half of such year. It is recommended, moreover, that during the earlier years of the course much incidental instruction in American government should accompany the work in History. Emphasis should be placed upon historical development of political institutions in order that the pupil may be brought to an understanding of what may otherwise appear arbitrary and irrational.

The course should begin with a study of local government. The student can be made to understand local institutions much more readily than those of the state or nation, since the former come within the range of his personal experience. The city will furnish the best and most numerous illustrations of this character. It will be relatively an easy matter to excite the curiosity and arouse the interest of the pupil in governmental organs which he can see and whose activities are brought home to him. In this way he will receive a real training in citizenship. From the institutions of the city it will be possible to proceed in like manner to those of the county, state and nation.

The student's interest in the work can be retained and heightened by visits to places which have to do with governmental activities. The city hall, public water and lighting plants, the public library, postoffice, the school itself—all will furnish excellent means for illustrating the work in American government. The pupil should be encouraged to study the government of his city and make reports upon various phases of its organization and work, e. g., the mayor, city clerk, street improvement and lighting. The work in American

government may also be supplemented by having debating societies discuss questions of civic interest.

A good textbook is desirable. In many cases its arrangement may not correspond to the above plan, but it will be possible to take up the parts of the text in a different order from that in which they are presented. The textbook must be largely supplemented by the teacher and by collateral reading and reference work. A small reference library is essential.

For library equipment, see pages 142-144.

ECONOMICS.

One-half unit may be offered.

The course in economics should not be given before the third or fourth year in the high school. The object of the course should be to create an interest in the more general economic laws. So far as possible the work should be connected with problems and questions which are of importance in our national life at the present time. Questions such as the tariff, single tax, immigration, capital and labor and similar problems, where there is much disagreement and bias, should be carefully analyzed. Magazine articles by our standard writers can be used to good advantage. Debating may serve a good purpose if properly handled. Care should be taken that questions are carefully worked out and that arguments have an economic importance. Throughout the course emphasis should be placed on those principles which are accepted as axiomatic and their bearing on our economic life of today.

The following are among the topics which should be considered:

The factors of production; capital and labor; division of labor; law of diminishing returns; marginal utility; cost of production; transportation; demand and supply; trusts and monopolies; socialism; money and credit; interest; rent; price; value; single standard; bimetalism; taxation; The Federal Reserve Bank Act.

For library equipment, see page 144.

SOCIOLOGY.

One-half unit may be offered.

Good citizenship should be the aim of a course in sociology. More intelligent understanding of civic and social problems should result from a well-guided study of such topics as growth of population; immigration; city problems; housing and homes; community health; poverty and care of the poor; crime and reform, and the negro problem. Current problems should have some consideration in the course. Magazine articles by our standard writers on social problems now before the public should be used. Pupils should not be admitted to the course unless they are mature enough to appreciate the problems and their bearing on our social life. In general the work should not be taken by pupils below the fourth year of the high school. Sociology should not be offered unless the teacher has had thorough training, and has sufficient maturity of judg-

ment to insure the proper attitude of mind on the part of the pupils. The required library should be secured. A standard text such as Ellwood's "*Sociology and Modern Social Problems*;" or Towne's *Social Problems*, should serve as a basis for the work.

For library equipment, see pages 144-145.

LATIN.

Four units may be offered.

Each year of Latin should be taught so that the student receives the maximum of value for the time spent upon it. While each year may be preparation for the next, it should be made worth while for those who pursue the subject no further. Attention should be given to correct pronunciation, reading aloud with proper expression, translation of Latin into idiomatic English, writing Latin and translating English into Latin. Derivation of English words, comparison of English syntax and word-order with Latin, and the teaching of English grammar, when necessary, should be a central aim of the work in Latin.

FIRST YEAR.

The first year should be spent in thoroughly mastering the elements of the language as given by a good book for beginners. From the first the student's knowledge of English should be consciously made to assist him in fixing an ample working vocabulary, and the Latin words acquired should function in better English understanding and expression. Drill in forms should be thorough.

SECOND YEAR.

Four books of Caesar's *Gallic War* should be read, and one lesson a week devoted to composition. The reading should be accompanied by a systematic review of grammatical forms and by a study of the leading principles of syntax. A composition book should be used in which rules are taught by means of sentences based upon the text. In the writing of Latin all long vowels should be marked. Sight reading should be a part of each week's work. The geography of the wars, and Roman military, civil, and social conditions and customs should be given a large share of attention.

THIRD YEAR.

Four of Cicero's orations against Catiline, the oration for the Manilian Law and the oration for the Poet Archias are usually read. Instead an equivalent may be read in Sallust's *Catiline*. The grammar and composition of the preceding year should be continued, and Roman political and social conditions studied.

FOURTH YEAR.

A thousand lines of Ovid's *Metamorphoses* followed by four or five books of Vergil's *Aeneid*, including the sixth book, are usually read. If only four are read, about eight hundred lines from the

Ecloges or *Georgics* should be read. If desired, the whole year may be devoted to reading six books of the *Aeneid*. The technique of the Latin hexameter should be taught and its rhythm should be felt as quantitative and not merely translated into an accentual rhythm. Greek and Roman mythology should be studied in connection with this year's work.

For library equipment see pages 145-146.

GREEK.

FIRST YEAR.

Introductory lessons, including twenty or thirty pages of Xenophon's *Anabasis*, practice in reading at sight and in writing in Greek, and the beginning of systematic study of grammar.

SECOND YEAR.

Seventy-five or one hundred pages of the *Anabasis*, either alone or with Attic Prose; practice in reading at sight, and systematic study of grammar; thorough grammatical review and practice in writing Greek, both based on the study of Books I and II of the *Anabasis*.

THIRD YEAR.

Attic prose: e. g., Lysias' Orations, or Plato's *Apology* and *Krito*, or Xenophon's *Memorabilia*, with practice in writing Greek, in grammar and in reading at sight. (2) Homer (2,500 to 4,000 lines); e. g., *Odyssey*, Books I-V, or *Iliad*, Books I-III (omitting 11, 499-end), and VI-VIII.

Since only a few of the larger schools offer Greek, no book lists are given in this manual. Students who elect these courses should have access to adequate references covering Greek literature.

GERMAN.

Four units may be offered.

FIRST YEAR.

(1) Careful drill upon pronunciation. (2) Systematic drill upon the elements of grammar, including the inflection of the articles, the noun, the adjectives, the pronoun, the verb, strong and weak; also upon the use of the common prepositions, the simpler use of the modal auxiliaries and elementary rules of syntax and word-order. (3) Abundant practice (a) in oral and written reproduction of the text, (b) in the memorizing of colloquial and idiomatic phrases, and (c) in dictation, (4) memorizing a few poems or songs, such as *Heidenrsölein*, *Die Lorelei*, and *Das Zerbrochene Ringlein*. Much of the teaching and all classroom directions should be in German.

All reading in this course should be intensive. The pupil should be required to give back the entire subject-matter in German, either in the form of German answers to German questions, repetitions

from memory, or free oral or written reproduction. The teacher may use discretion as to the number of pages thus treated. Ordinarily, a class cannot treat more than 100 pages in this manner with sufficient thoroughness.

Some of the most common texts for first year readings are as follows:

Guerber's *Märchen und Erzählungen*.

Seeligmann's *Altes und Neues*.

Glück Auf.

Prokosh's Texts in *Introduction to German*.

Fahsel's *Allerlei*.

Fick's *Dies und Das*.

Anderson's *Märchen*.

Gronow's *Jung Deutschland*.

SECOND YEAR.

The second unit calls for about 300 pages of moderately difficult reading, chiefly prose, with constant practice in oral and written reproduction of selected portions; also drill upon the more difficult chapters of grammar such as the passive voice, use of cases with prepositions, verbs, adjectives, uses of tenses and modes (especially the infinitive and subjunctive), likewise upon word-order, and word-formation. Thoroughness should be insisted upon rather than quantity.

Some texts commonly read during the second year:

Baumbach's *Sommermärchen und Waldnovellen*.

Leander's *Träumereien*.

Zschokke's *Der Zerbrochene Krug* and *Das Wirtshaus zu Cransac*.

Storm's *Immensee* and *Germelshausen*.

Heyse's *L'Arrabiata* and *Das Mädchen von Treppi*.

Wildenbruch's *Das Edle Blut*.

FOR COMPOSITION:

Pope's *Writing and Speaking German*.

Stern's *Geschichten vom Rhein*.

Manley's *Ein Sommer in Deutschland*.

Other good texts are published by all the large book companies.

THIRD YEAR.

The third unit calls for (1) the reading of 400-500 pages of good modern prose stories and plays, and the ability to use the language effectively as a means of oral and written expression; and (2) abundant practice in writing of composition.

A good deal of sight reading of easy German should be done during this year. Some texts which may be read during this year are:

Riehl's *Burg Neideck*.

Storm's *Der Schimmelreiter*.

Schiller's *Wilhelm Tell*.

Schiller's *Die Jungfrau von Orleans*.

Goethe's *Hermann und Dorothea*.

Schiller's *Ballads and Lyrics*.

Sudermann's *Frau Sorge*.

Moser's *Der Bibliothekar*.

Freytag's *Die Journalisten*.

A well balanced course will contain prose and poetry, also at least one play.

FOURTH YEAR.

In the fourth year four or five more advanced German classics should be read. A general survey of German literature may also be taken and short productions of the most representative writers read rapidly. The pupils should have access to some history of German literature like that of Franke or Scherer.

The pupils should do advanced composition work during this year along the line of original essays.

For library equipment, see page 146.

FRENCH.

Four units may be offered.

FIRST YEAR.

The work of the first year should aim to give the student: (a) accurate pronunciation; (b) knowledge of the rudiments of the grammar; (c) ability to translate simple sentences into French and to express in idiomatic French simple ideas; (d) ability to understand simple ideas expressed orally in French; (e) vocabulary and knowledge of construction sufficient to enable him to read ordinary French with considerable ease.

Drill in pronunciation should begin with the first meeting of the class and continue until the last. As a part of such drill frequent dictations are indispensable.

The grammatical work should include the regular and the more common irregular verbs, the inflection of nouns, adjectives, participles, and pronouns, the use of pronouns, adverbs, prepositions, and conjunctions, sentence-order, and the elements of syntax.

A minimum of 150 pages should be read. A number of readers present a sufficient variety of graded material, and some of the easier of the texts mentioned below for the second year could be used profitably. There should be constant practice in translating into French easy variations of the texts read, and this, in conjunction with the English sentences given in the grammar, will insure an abundance of drill in this respect.

SECOND YEAR.

The work of this year should include the reading of a minimum of 350 pages of modern prose, including a number of short dramatic works, with constant practice in retranslations of variations of the texts read. Drill in pronunciation and the writing of French from dictation should be continued. The grammar work should include

a careful review, with drill upon all irregular verbs that are not very rare, the uses of the subjunctive, and a more detailed study of syntax. There should be constant practice in construction of sentences. Students should be required to give either orally or in writing abstracts of the texts read. Any of the following texts, recommended by the Committee of Twelve of the Modern Language Association of America, are suitable for the second year: About's *Le Roi des Montagnes*; Bruno's *Le Tour de la France*; Daudet's easier short tales; La Bédollière's *La Mère Michel et Son Chat*; Erckmann-Chatrian's stories; Foa's *Contes Biographiques* and *Le Petit Robinson de Paris*; Foncin's *Le Pays de France*; Labiche and Martin's *La Poudre aux Yeux* and *Le Voyage de M. Perrichon*; Legouv   and Labiche's *La Cigale chez les Fourmis*; Malot's *Sans Famille*.

THIRD YEAR.

The work of this year should include the reading of from 600 to 1,000 pages of French, with constant practice in paraphrasing and abstracting portions of the texts in French. The drill in pronunciation and in writing of French from dictation should be continued unremittingly. A good grammar should be studied carefully. Students should be drilled in writing simple original themes in French. The texts recommended by the Committee of Twelve are as follows: About's stories; Augier and Sandeau's *Le Gendre de M. Poirier*; B  ranger's poems; Corneille's *Le Cid* and *Horace*; Copp  e's poems; Daudet's *La Belle-Nivernaise*; La Br  te's *Mon Oncle et Mon Cur  *; Madame de S  vigne's letters; Hugo's *Hernani* and *La Ch  te*; Labiche's plays; Loti's *P  cheur d'Islande*; Mignet's historical writings; Moli  re's *L'Avare* and *Le Bourgeois Gentilhomme*; Racine's *Athalie*, *Andromaque*, and *Esther*; George Sand's plays and stories; Sandeau's *Mademoiselle de la Seigli  re*; Scribe's plays; Thierry's *R  cits des Temps M  rovingiens*; Thiers's *L'Exp  dition de Bonaparte en Egypte*; Vigny's *Canne de Jonc*; Voltaire's historical writings. It is recommended, however, that only sparing use be made of the classical plays, especially those of Corneille and Racine, which are more suitable for a fourth year.

Students electing these courses should have access to some of the standard works of French literature.

FOURTH YEAR.

During this year four or five more advanced literary productions should be read. A good deal of original composition work should be done. A general survey of the history of French literature also may be taken and short productions of important authors read in connection with this survey. Students should have access to some standard work on the history of French literature.

SPANISH.

Three units may be offered.

FIRST YEAR.

The instruction should above all be practical. Drill in variety should be the method, and thoroughness, the object. Students, on finishing this course, should be able to read easy texts like Hill's *Spanish Tales for Beginners*, Valera's *El Pájaro verde*, and Carrión and Vital Aza's *Zaragüeta*. About 150 pages of connected prose should be read. Exercises in the memorizing of vocabulary should be given frequently. A small portion of each period should be devoted to pronunciation and dictation. The conversational method should be employed as soon as possible and gradually enlarged in its application. For this purpose, a rather limited every-day vocabulary dealing with objects of common use, and Spanish and Latin-American life and customs should be compiled and put into practice, preferably in the form of short, rapid questions and answers.

SECOND YEAR.

A rapid review of the grammar, along with the writing of all composition work, should be made. The classroom work should be carried on as largely as possible in Spanish. The reading of about 350 pages of modern prose, such as that of Galdós *Mariansela*, Valera's *El Comendador Mendoza*, Moratín's *El Sí de las Niñas*, is required. Some attention should be paid to literary qualities. A good composition book should be used both for composition and conversation.

THIRD YEAR.

Some of the more difficult masterpieces should be taken up, and considerable time devoted to their value as literature. Students should be referred to good histories of Spanish literature.

The ability to converse should be developed.

No book list is given in this manual for Spanish, but students electing the course should have access to some of the standard works of Spanish literature.

SCIENCES.

General Suggestions:

The work in the sciences consists of three closely related parts—namely, class work, lecture demonstration work, and laboratory work.

a. *Class Work.* This work should consist in the study of at least one standard text. The laboratory work of the students should be closely correlated with the work in the text and the recitation should aim to give the student clear concepts of the terms of the science studied; to systematize knowledge gained; to form

correct generalizations; and finally to apply as far as possible all principles studied to the solution of simple practical problems. In the physical sciences many of these problems should be concrete and numerical. In both the physical and the biological sciences the teacher should vitalize the subject matter by opening the eyes of the pupils to the fact that the science which they are studying is not something abstract existing in textbooks only, but that the principles learned are at the basis and are an explanation of natural phenomena around them. The application of the principles of the sciences to manufacturing and commerce should receive close attention. The local manufacturing establishments, the plants of public utilities, such as lighting and power plants, the water system etc., should be visited by the classes and studied. In the biological sciences the student should first become thoroughly acquainted with the plant life and animal life of his immediate surroundings. In agriculture a close study of local agricultural conditions should be made.

b. Lecture demonstration work.

The object of this work by the teacher is to perform experiments before the class which require complicated apparatus too expensive to equip for individual experimentation by the pupils, or where too much time would be consumed by the experiment. The lecture method of recitation should be used sparingly, and to illustrate such matters as the student himself can not work out without assistance. While demonstration work is important during the recitation period, under no circumstances should the teacher perform the experiments intended to be performed by the students themselves. Students should not incorporate notes taken on demonstration work and lectures by the teacher in their laboratory notebooks. Any notes taken on lectures and demonstration work should be kept in a separate notebook.

c. Laboratory Work.

Two eighty-minute periods of laboratory work a week for the school year must be done in all the sciences for approval.

Each pupil should perform a definite number of experiments. The number of experiments varies in the various sciences, but should not be much less than outlined in the standard laboratory manuals now used in the high schools.

It is advisable to use a laboratory manual separate from the textbook. Strong teachers may be able to work out manuals of their own, but the average teacher will do well to adopt some good manual and adapt the same to the special needs of his class.

The laboratory work should be carefully planned by the teacher. Sufficient apparatus should be provided to permit each individual pupil to perform the experiment. Some experiments may, however, be worked out more advantageously by two pupils working together. Under no circumstances should the laboratory work resolve itself into the setting up of apparatus and performing of the experiment by two or three aggressive pupils in the class with the rest of the class looking on in a passive manner and copying results.

The laboratory notebook of the pupils should be a concise record of what the student himself has done. In the physical sciences, the student should state in his own language (a) the object of the experiment, (b) the apparatus used (c) the setting up of the apparatus, accompanied by a sketch or drawing properly labeled wherever this adds to the clearness of the description), (d) results in a tabulated form, (e) and finally, the conclusions and practical applications. Under no circumstances should the student's record of the experiment be merely a copy of the directions in the manual.

The notebook should be neat, clear and accurate. The use of a loose-leaf notebook is recommended.

The following sciences may be offered:

PHYSICS.

Two units may be offered.

FIRST YEAR.

The amount of subject matter for the first unit in physics should be that covered by a standard high school textbook in the subject.

In the laboratory, the student should perform at least thirty individual experiments, and should keep a careful record of them. At least twenty of these should involve numerical work and the determination of such quantitative relations may be expressed in whole numbers. Such quantitative work should aim to foster the habit of thinking quantitatively, but should not attempt to verify laws with minute accuracy nor to determine known physical constants with elaborate apparatus.

In the following syllabus of topics the starred (*) topics are considered especially important. The teacher is not required to follow the order of topics in the syllabus. The list is not intended to include all the material for the year's work. It is made short, in order that each teacher may be free to supplement it in a way that fits his individual environment. It includes those topics which are commonly agreed on as essential and which are capable of comprehension by boys and girls of high school age.

The syllabus of topics is as follows:

- *1. Weight, center of gravity.
- *2. Density.
- *3. Parallelogram of forces.
4. Atmospheric pressure; barometer.
- *5. Boyle's law.
6. Pressure due to gravity in liquids with a free surface; varying depth, density, and shape of vessel.
- *7. Buoyancy; Archimedes' principle.
- *8. Pascal's law; hydraulic press.
9. Work as force time distance, and its measurement in foot-pounds and gram-centimeters.
10. Energy measured by work.

- *11. Law of machines: work obtained not greater than work put in; efficiency.
- *12. Inclined plane.
- *13. Pulleys, wheel and axle.
- *14. Measurement of moments by the product of force times arm; levers.
- 15. Thermometers: Fahrenheit and Centigrade scales.
- 16. Heat quantity and its measurement in gram calories.
- *17. Specific heat.
- *18. Evaporation; heat of vaporization of water.
- *19. Dew point; clouds and rain.
- *20. Fusion and solidification; heat of fusion.
- 21. Heat transference by conduction and convection.
- 22. Heat transference by radiation.
- 23. Qualitative description of the transfer of energy by waves.
- 24. Wave length and period of waves.
- 25. Sound originates at a vibrating body and is transmitted by waves in air.
- *26. Pitch and period of sound.
- *27. Relation between the wave length of a tone and the length of a string or organ pipe.
- *28. Resonance.
- 29. Beats.
- 30. Rectilinear propagation of light; pin-hole camera.
- *31. Reflection and its laws; image in a plane mirror.
- *32. Refraction, and its use in lenses; the eye, the camera.
- *33. Prisms and dispersion.
- 34. Velocity of light.
- 35. Magnetic attractions and repulsions.
- *36. Field of force about a magnet.
- 37. The earth a magnet; compass.
- 38. Electricity by friction.
- 39. Conductors and insulators.
- *40. Simple, galvanic cell.
- *41. Electrolysis; definition of the ampere.
- *42. Heating effects; resistance; definition of the ohm.
- *43. Ohm's law; definition of the volt.
- *44. Magnetic field about a current; electromagnets.
- *45. Electromagnetic induction.
- *46. Simple alternating current dynamo of one loop.
- *47. Electromagnetic induction by breaking a circuit; primary and secondary.
- 48. Conservation of energy.

If the second year is given, the same plan should be continued with more advanced work.

For laboratory equipment, see pages 93-96.

For library equipment, see pages 146-147.

CHEMISTRY.

Two units may be offered.

FIRST YEAR.

The first year should include the work as outlined in a standard textbook of high school grade. It should consist of two closely related parts, namely, recitations including demonstrations by the teacher, and laboratory work.

Each pupil should be provided with an outfit of apparatus for the laboratory exercises, which should be largely carried out by the pupils working independently. A limited number of experiments, however, may be conducted by two pupils working together. Each pupil should record in a notebook what he observes, and should do so at the time the observations are made. The interpretation of observed results and calculations may be recorded in the notebook later, if the teacher so prefers.

As chemistry is an art as well as a science, stress should be laid on handling and setting up apparatus in a neat and orderly manner. In the use of reagents, thought should be given to proportions, and the wasting of materials should be prevented. In experimentation, careful planning and skill of the hand should be emphasized. In this way the laboratory work becomes an interacting process of thinking, doing and thinking. The students, for example, should know why an apparatus should be air-tight and how to make it air-tight; why gases are washed and dried, and how this operation must be done.

The text and reference books, as a rule, furnish an adequate and systematic account of the chemical changes selected for study, but the equally important feature of the course, the art of chemistry, is imparted directly by the teacher.

In both laboratory and class work, the materials chosen for study should be restricted to a relatively small number of elements and their chief compounds. Interest in the work may be increased by applications of the facts and generalizations of the text to familiar phenomena in daily life. Visits should be made to the gas works, ice plant, limekiln, and other chemical industries in the locality. The more important discoveries of chemistry should become associated with the great masters of the science by anecdote, personal characteristics, or contemporary events.

If the second year is given it should continue the same plan with more advanced work.

For laboratory equipment, see pages 96-99.

For library equipment, see page 147.

GENERAL BIOLOGY.

One unit may be offered.

This course should be designed to present a general survey of biological science, including the life processes, the activities, the adaptations as well as the structure of organisms, treated from the standpoint of their general relations. General biology is the study of the fundamental properties of living things, as illustrated by a carefully selected series of both animal and plant forms.

The laboratory work, guided by suitable directions, should precede textbook work on any subject, and the pupil should be required to make careful drawings and notes on all observations. Accurate observations and records of the normal activities of living animals and plants should be made whenever practicable, both in the laboratory and in the field. Simple experiments upon the behavior of animals are very valuable, and should be made if possible.

The following series of forms for study is suggested: (1) amoeba; (2) paramoecium or vorticella; (3) haematococcus; (4) yeast plant; (5) spirogyra; (6) hydra; (7) mucor or penicillium; (8) earthworm; (9) crayfish; (10) grasshopper; (11) fern; (12) fresh-water mussel; (13) seeds and seedlings; (14) flowering plant; (15) frog, with metamorphosis. The last two or three months may be devoted to human physiology. Use a good standard text.

For laboratory equipment, see pages 99-101.

For library equipment, see pages 147-148.

BOTANY.

Two units may be offered.

FIRST YEAR.

The work should deal, for the most part, with the seed plants, and should consist of recitations, laboratory work and field studies. While the study of structure is essential, yet most emphasis should be placed on the activities of plants. The studies with lower plants should deal almost entirely with gross structures, life habits and economic importance.

The outline is not intended as an essential arrangement, for the latter is best determined by convenience. Any arrangement, however, should enlist the interests of the student in the living plant—the plant in action—and laboratory studies should be made to bear this out. It is better, also, to omit some of the topics suggested than to treat them inadequately. The teacher must determine the apportionment of time, and bring out the connection of the topics.

The following topics are suggested:

General Studies with Seed Plants.—(1) The parts of a mature plant—roots, stem, leaves, flower. (2) The functions of roots and their modifications. (3) The functions of stems and their modifica-

tions. (4) Buds. (5) Leaves and their work. (6) Flowers, parts, functions, adaptations for pollination. (7) Fruits, kinds, adaptations for dispersal, value to man. (8) Seeds, structure, germination, etc. (9) Relation of plants to light, soil, water, atmosphere. (10) Plant families, studies of common representatives of the important plant families, as the roses, legumes, grasses, lilies, composites, etc. Forests and forest trees may well be considered here.

Studies with Lower Plants.—(1) Algae, general appearance, abundance, local distribution, and relation to water supplies. (2) Bacteria, relation to decay, to soils, to disease in plants and animals, to purity of milk and water supplies, to public hygiene. (3) Molds, appearance, occurrence, importance in relation to food products. (4) Yeasts and fermentation. (5) Rusts, smuts, etc., as the cause of plant diseases, parasitic method of living, control of plant diseases. (6) Mushrooms, edible and poisonous, cultivation, agents in destruction of timber. (7) Liverwort, habits, distribution and life cycle. (8) Moss, habits, distribution and life cycle. (9) Fern, life cycle, distribution, local types.

Careful drawings, notes, and deductions should be made. The student should make his own studies first and then read his text.

If the second year is given, the same plan should be continued with more advanced work.

For laboratory equipment, see pages 99-101.

For library equipment, see page 148.

ZOOLOGY.

Two units may be offered.

FIRST YEAR.

A high school course in zoology should have three objects: (1) To acquaint the student with the common animals of his own neighborhood, with the adaptations which these animals show to their environment, and with their habits and economic importance. (2) To afford training in critical methods of making and recording observations both by drawing and by writing, both in the laboratory and in the field. (3) To teach enough of the interpretation of the observed facts that the student may understand the current methods on interpretation from the morphological, physiological and ecological standpoints.

The study of each form should include a consideration of the following: (1) habitat; (2) geographical distribution; (3) food; (4) adaptations to environment, including relations to other forms of animal and plant life; (5) general activities; (6) economic relations; (7) life history, and (8) structure.

In zoology the same methods of instruction should be followed as are outlined above under general biology.

The following series of forms for study is suggested:

(1) Protozoa (Amoeba, and Paramoecium or Vorticella); (2) Hydra; (3) Starfish; (4) Earthworm; (5) Crayfish; (6) Grasshopper

and other insects in comparison; (7) Fresh-water Mussel or Snail; (8) Frog with metamorphosis; (9) A bird, the Pigeon; (10) A Fish; (11) A Mammal, the Cat, or Rabbit.

When the instructor is prepared to teach it, the last half year of zoology may be human physiology.

A good standard text should be used.

If the second year is given, it should consist of more advanced work with the study of additional forms.

For laboratory equipment, see pages 99-101.

For library equipment, see pages 148-149.

GENERAL SCIENCE.

One unit may be offered.

Owing to the diversity of opinion concerning the subject-matter of general science no outline of a course is here attempted. While it will probably be necessary for teachers to use some text as a guide, the course should be adapted so far as possible to local conditions. A satisfactory reference library should be provided and the teacher should select from this the subject matter suited to the problems or projects on which the class may be working. For a general discussion of the teaching of general science, see the Sixty-sixth Missouri Report of Public Schools, pp. 82-90.

In view of the fact that general science is still in the experimental stage it should be taught by a strong teacher who has both the time and ability to organize a course. The course should be given according to the following conditions:

1. The course shall be offered in the eighth or ninth grade. Students above the ninth grade should not be admitted.

2. At least 280 minutes per week shall be spent in class exercises under the direction of the teacher.

3. Neat and concise notebooks should be kept by the class.

4. A teacher shall be secured who has had at least seven and one-half semester hours in one field of science and at least five hours in each of two others. In addition the teacher should have professional training in the teaching of the subject.

5. Satisfactory laboratory equipment shall be provided. (See page —.)

6. Excursions to objects of scientific interest in the community should form a valuable part of the course.

7. In so far as possible the problem or project method should be used. This method, however, should not be attempted unless the teacher has planned the projects, supplementary reading material and demonstration experiments carefully in advance.

8. A satisfactory list of reference books should be provided.

9. Magazines such as Popular Mechanics, Scientific American National Geographical Magazine and School Science and Mathematics should be provided.

For library equipment see page 151.

For laboratory equipment, see pages 107-109.

PHYSIOLOGY.

One-half or one unit may be offered.

ONE-HALF UNIT COURSE.

The advancement which has been made recently in matters pertaining to personal and public hygiene, sanitation, preventive medicine and other kindred topics of civic or social nature has created the need for a course in our high schools dealing with these topics. With this end in view, a one-half unit course has been outlined for those schools which desire to give such work.

This course must not be a repetition of the course given in elementary physiology. It must be definite and deal with problems of advanced nature. A good reference library and supplementary reading is essential. This work should not be attempted unless the teacher has had special training in physiology and hygiene. A course in Preventive Medicine is suggested for those teachers who expect to teach the half-unit course. Extensive laboratory equipment is not essential for credit. The laboratory work must necessarily be limited and will consist of demonstrations by teacher and pupils rather than individual experiments. This course should not be given before the third year in the high school, except in third class high schools, where it may be given the last half of the sophomore year. The one-half unit in physiology may be combined with other one-half unit courses for a unit's credit.

While a fair knowledge of anatomy and physiology is necessary for the foundation work in this subject, the spirit of the course implies a very different treatment from the formal treatment of the older texts with their extended outlines and emphasis on the technical. The work should be especially adapted to the every-day activities and conditions. So far as possible it should be concrete and personal. Personal and public hygiene should be stressed throughout this course, with special emphasis on health problems of the home and community. Civic problems of sanitation, food and water supply and co-operation in combating disease are of paramount importance.

The following topics are suggestive as to some of the work which may be done:

Boards of health—state, city and county; sanitary surveys of towns as to water supply, sewerage and garbage, milk supply, school buildings, churches and assembly halls, grocery stores and meat markets; patent medicines; superstitions and primitive ideas regarding diseases and the body; advertising quacks; fatigue; accidents; first aid; fresh air; exercise—normal and violent; sleep; bacteria and disease; disease carriers; preventable diseases, occupational diseases; seasonal diseases; type diseases—tuberculosis, typhoid, diphtheria, smallpox; immunity—natural and artificial;

vaccination, the theory and value of; the glands of the body and their peculiar functions; the white and red corpuscles of the blood and their uses; eating and food values; stimulants and narcotics; personal hygiene—common principles of care of body, hair, nails, skin, bathing, etc.; play and athletics.

The school should have a well equipped library which should be used daily throughout the course. It is impossible to secure a text which will fully meet the needs of the course. The following are among the books which may be in the hands of the pupils as a basis for much of the work:

Walters, *Principles of Health Control*, D. C. Heath & Co.

Coleman, *The People's Health*, The Macmillan Co.

Ritchie *Sanitation, and Physiology* World Book Co.

For library equipment, see page 150.

ONE UNIT COURSE.

This course should be preceded by a course in general biology, or by a course either in zoology or in botany. At least two double periods a week should be given to laboratory demonstrations by the instructor and to dissections and physiological experiments performed by the student, always under careful supervision. A certain amount of time should be given to the anatomical study of structures which are to be used later for physiological experiment and demonstration; but the structures should be studied primarily for the sake of a better understanding of the functions. Careful notes and drawings of the structures dissected should be preserved for use as guides later in making physiological preparations. The laboratory experiments performed on the living organs and tissues should include tests to show the characteristics of muscular contraction, nerve irritability, blood pressure, the heartbeat, the pulse, the capillary circulation, etc. Notebooks should be kept in connection with all physiological demonstrations. It is recommended that the elementary phases of physiological chemistry be presented in the subject of digestion, secretion, blood clotting, and the composition of one or two tissues. The original laboratory notes taken at the time of the experiment should be preserved. See courses in biology and zoology.

For laboratory equipment, see pages 101-103.

For library equipment, see pages 149-150.

PHYSICAL GEOGRAPHY.

One unit may be offered.

The following outline includes only the more essential facts and principles of a unit course:

Mathematical Geography.—(1) Review of subject as presented in grammar school geography, including construction of diagrams to show inclination of the earth's axis to the plane of its orbit, perihelion and aphelion, position of equinox and solstice; measurement of sun's altitude by means of sun board; determination of latitude

by measuring altitude of pole star. (2) The earth considered as a planet: rotation, proofs, results; revolution, proofs, results; magnetism, compass, poles, variation.

The Atmosphere.—Composition, extent and offices of the atmosphere. (2) Temperature: source of temperature; variation of temperature; isotherms; isothermal charts of the world for January and July. (3) Pressure: measurements of pressure; relation of pressure to temperature; study of isobars on United States weather map; distribution of pressure; relation of isobars to isotherms. (4) Atmospheric moisture; source; amount; how measured. (5) Atmospheric movements: winds, classes, direction, cause; special study of character and paths of storms in the United States. (6) Weather and climate; use of weather maps.

The Land.—(1) Earth materials: study of the common rocks and rock-forming minerals; more detailed study of the rocks and soils of the locality. (2) Land forms, including, after the student has first been taught to interpret the Geological Survey Maps, a study of the following types of topography, illustrated by the maps: plains, simple plain, a plain with valleys, a plain with hills, a plain with hills and valleys; plateaus, simple plateau, plateau with valleys, plateau with hills, a plateau with hills and valleys; mountains, a simple mountain, a mountain with valleys. (3) Weathering: conditions affecting weathering; weathering agents; transportation of material; results of weathering. (4) Special study of the valley: including birth of valley; how it grows; how it gets a stream; limits of growth; accidents that may happen to valleys. (5) Ground water: source; amount; use. (6) The work of streams. (7) Work of ice: lake ice, river ice, seashore ice, snow line, snow fields, local and permanent; formation of glacial ice, glacial movements, types of glaciers, work of glaciers, icebergs. (8) The ancient ice sheet: evidence of its existence; how it developed; extent; center of dispersion; unglaciated areas; changes produced by erosion and deposition of material; characteristics of glaciated areas of United States.

Volcanoes and Volcanic Phenomena.—(1) General facts, kind and distribution. (2) Study of cone, dyke, crater, fissure, lava.

The Ocean.—(1) Form, divisions and general characteristics of the ocean. (2) Depth, density, temperature and composition of ocean waters. (3) Characteristics of ocean floor. (4) Distribution of life in ocean. (5) Movements of ocean water; waves, cause and effect; currents, causes and effects; more important currents; tides, character, cause. (6) Special study of shore lines.

The Earth and Man.—Relation of man, plants and animals to climate, land forms and ocean areas.

For laboratory equipment, see pages 103-106.

For library equipment, see pages 151-152.

AGRICULTURE.

One, one and one-half or two units may be offered.

A maximum of two units may be offered. The second year's work should not be attempted unless the instructor has had the required preparation and the community can afford the necessary laboratory and field facilities. The first year agriculture is a prerequisite to all other courses. For requirements for second year courses see second year agriculture. A supplement will be issued soon, outlining more in detail these half unit courses.

FIRST YEAR.

One unit.

This should be a general course, covering the work in agriculture as found in the standard texts.

The work should consist of two parts, (1) individual laboratory and field work, and (2) recitations based upon the laboratory work, the textbook and assigned readings. Three periods a week should be given to the recitation and not less than two eighty-minute periods a week to laboratory and field work. As a rule, the laboratory and field work should precede rather than follow the recitation. Every school should have a small plat of ground, an acre or more, for a school farm and garden. It is not essential that the topics be studied in the order given below or in the order given in any textbook. A seasonal arrangement is strongly recommended. The work in animal husbandry should include a careful study of the principal types and breeds of the more common farm animals. Emphasis should be placed upon the study of horses, cattle, swine and poultry. There should be practice in stock judging, with the use of the score cards.

No special list of experiments is required. Each teacher should secure from the standard laboratory manuals a list of at least sixty experiments. These experiments are to be in addition to any experiments or demonstrations given by the teacher. Practically every topic in the outline given below may be made the basis of a profitable laboratory or field exercise. The outline is as follows:

Farm and Garden Crops.—(1) Plant propagation: seeds, buds. (2) Cereal crops: corn; wheat; oats; rye; barley. (3) The legumes: the clovers; cowpeas; soy beans; alfalfa; vetch. (4) Grass crops: timothy; blue grass; red top; orchard grass; millet. (5) Orchard crops: apples; peaches; pears; plums; cherries; nuts. (6) Small fruits: strawberries; grapes; blackberries; raspberries; currants; gooseberries. (7) Kitchen garden crops: potatoes; sweet potatoes; tomatoes; melons; cabbage; cucumbers; radishes; lettuce; beans; peas; onions. (8) Fibrous and miscellaneous crops: cotton; flax; hemp; broom corn; castor beans; sorghum. (9) The wood lot: timber crop. (10) Insect enemies of farm crops.

Soils.—(1) Origin and formation. (2) Composition and classification. (3) Soil water. (4) Soil air. (5) Soil temperature. (6) Soil drainage. (7) Soil organisms. (8) Meaning and method of testing the soil.

Animal Husbandry.—(1) The horse: origin and brief history; the two principal types, including the speed type and the draft type; breeds, including draft breeds (Percheron, Clydesdale and English Shire), roadsters (American trotter, American saddle horse, English thoroughbred, Hackney, French coach); care of horses. (2) Cattle: origin and brief history; the two principal types (dairy cattle, beef cattle); breeds, including beef breeds (Shorthorn, Hereford, Polled Hereford, Aberdeen Angus, Polled Durham, Galloway), dairy cattle (Holstein, Friesian, Jersey, Guernsey, Ayrshire, Dutch Belted, Brown Swiss), dual purpose breeds (Shorthorn, Devon, Red Polled); cattle products, including meat, milk, leather, glue, etc. (3) Sheep: the two types, including wool-producing and mutton producing; principal breeds, including wool-producing, (American Merino, Delaine, Rambouillet), mutton producing (Shropshire, Southdown, Cotswold); care of sheep. (4) Swine: the principal breeds, including Poland China, Berkshire, Duroc-Jersey, Chester White, Hampshire, Tamsworth, Large Yorkshire; care of swine; diseases of swine and how to control or prevent them, especially cholera and tuberculosis. (5) Poultry. (6) Chickens: the four principal types, including meat type, egg type, general purpose type, ornamental type; breeds, including meat type or Asiatic class (Brahma, Cochin, Langshan); egg types or Mediterranean class (Leghorns, Minorcas, Black Spanish); general purpose or American type (Plymouth Rock, Wyandotte, Rhode Island Red); care of poultry, including feeding chickens, the incubator, the chicken house; poultry and poultry products, importance, value and use.

Farm Management.—(1) Choice of farm. (2) Farm sanitation. (3) Farm buildings. (4) Farm machinery. (5) Maintenance of soil fertility. (6) Improvement of farm animals. (7) Farm records and accounts. (8) Feeds and feeding. (9) Miscellaneous problems.

Ornamental Gardening.—(1) Location of building and farm structures. (2) The lawn. (3) Roads, walks and drives. (4) Arrangement of trees, shrubs and flowers. (5) Planting and care.

See also 1913 supplement to the State Course of Study, issued by State Department of Education.

For laboratory equipment, see pages 106-107.

For library equipment, see pages 152-154.

SECOND YEAR.

One or one-half unit may be offered.

There is a growing demand for more advanced work in Agriculture than that offered in the first year. To meet this need half unit courses may be offered. One or not more than two of these courses may be offered in any high school. First year Agriculture

is prerequisite to this work. The course or courses should be offered for which there is a practical need in the community and for which the teacher has had adequate preparation. No teacher should attempt this work who has not had at least fifteen hours of college work in Agriculture with a minimum of five hours in each half-unit taught. No course should be offered for which there is not ample opportunity to make practical applications of principles studied. Unless provision is made for making demonstrations, carrying on projects and directly connecting the work with farm practices, second year Agriculture should not be offered.

Not less than two double periods a week must be given to laboratory and field work. Improved herds, silos, modern machinery, poultry, greenhouses, gardens, feeding pens, elevators, growing crops, dairy barns and other improved buildings, and other such material should be brought within the reach of the classes through field trips. Projects should be carried on by the classes as a whole and by individual members of the class. Some project should be assigned to or selected by each pupil. The pupil should be held responsible for successfully carrying out the work and making a report at the end of the course. The class as a whole should work out a few such projects. A notebook should be kept by each pupil in which is kept a record of all laboratory, field and project work. The laboratory exercises should be planned to avoid duplicating work given in first year. Much of the material for the laboratory work in these courses can be secured at home. No list of required apparatus is appended to this manual. Under each course is suggested the material which should be in the laboratory. Such of this material as can not be secured at home may be secured from the scientific companies mentioned in connection with laboratory equipment for first year Agriculture. The Missouri College of Agriculture at Columbia will furnish at cost, collections of economic seeds, plants and weeds, plant diseases, injurious insects and typical Missouri soils.

HORTICULTURE.

One-half unit.

The work in horticulture should not be a series of lessons from a textbook but should be connected closely with laboratory, field and project work. Many practicums should be worked out. The community should afford ample opportunity for observation and experimentation. A room adequate for sand-table, germinators and supplies must be provided. The program of the pupil should be arranged to give ample time for field work. At least two double periods per week must be given to field and laboratory work. Each pupil should keep a notebook covering such work. The laboratory exercises should be arranged to avoid duplicating the work of the first year.

1. *Projects:* The renovation of an old orchard; the renovation of an old vineyard; construction of hot bed and use for raising garden plants; canning club; landscape gardening—home or school; growing

vegetable crop on given area; use of cold frame; planning and caring for public park; budding and grafting on a practical scale, storing grafts; working out life history of insects, beneficial and harmful; flower beds; pruning trees at different seasons; protecting trees from enemies or frosts; collecting and transplanting local shrubs.

2. *Field Trips:* Spraying; pruning vineyard; pruning orchard at different seasons; visit to home gardens; visit to truck farm; visit to nursery; visit to greenhouse; observations for orchard and garden insects; budding and top grafting; inspection of garden or orchard products in store or storehouses for typical diseases; gathering and packing fruit.

3. *Material Needed:* Spraying machine; pruning shears, knives and saw; grafting and budding knives; grafting wax and strings; smudge pots; stocks and scions; lime; sulphur; arsenate of lead; paris green; copper sulphate; kerosene; formalin; jars for preserving fruits, etc.; insect frames, tree paints and washes; specimens of orchard and garden insects and diseases; flower pots; germinators; sand tables for propagation; collection of local shrubs; collection of typical seeds; material for hot beds and cold frames; material for soft wood cuttings; hoes; rakes; dibbles; spades, etc.

For library equipment, see page 156.

ANIMAL HUSBANDRY.

One-half unit.

Too much time should not be given to a study from the text book of types, breeds, etc. The course should be given only where there is opportunity to inspect and study improved stock, good dairies and poultry flocks. There is much material in the average texts which should not be studied intensively. The aim of the course should be to know more intimately the best practices of breeders, dairymen and poultrymen. Sufficient field work should be done to enable the pupil to know by sight a good animal. Different types and breeds should be studied comparatively. The different parts of the animal should be known so well that the score card can be applied intelligently. Practice should be given in identifying types and breeds. The co-operation of the progressive farmers should be sought. Talks and demonstrations by the experienced can be used to good advantage. Good barns and poultry houses should be visited and studied. The handling of milk and milk products should be studied at first hand. The more fundamental principles of breeding should be considered. The common diseases should be given attention. Work may be given in planning simple buildings and calculating the cost of material.

It is suggested that stock judging teams be selected from the class and that contests be held with neighboring schools.

1. *Projects:* Keeping dairy record of one cow; of a herd of cows; feeding dairy cow or cows different rations and testing results; fattening pigs on different rations; poultry raising and egg records; keeping record of gain in weight of fattening stock; co-operation

with feeders; butter making; construction of poultry house; use of the incubator; judging teams; contests with other schools; make surveys of community or county as to pure bred stock; dairy cows, plan and location of barns; care of stock, etc.

2. *Field Trips:* Creamery or cream station; dairy barns; poultry yards; fairs and exhibits; stock barns; feeding lots; testing milk for dairyman; slaughtering house; vaccination for cholera; tuberculin test; visit meat market and investigate cuts of meat and prices.

3. *Material Needed:* Herds; flocks; barns; poultry house, etc.; score cards, single and comparative; egg tester; incubator; complete Babcock Tester for whole, skim, butter milk and cream; lactometer; blanks for keeping dairy herd records; milk and milk products; pictures of famous animals.

For library equipment, see page 154.

SOILS.

One-half unit.

Some good text such as Whitson and Walster, *Soils and Soil Fertility*, should be used as a text. This course should not be offered unless the school is able to use demonstration plots in connection with the work. If the school does not have a demonstration plot, the co-operation of farmers and gardeners should be sought in showing by demonstration the principles worked out in classroom. The pupils should be given sufficient field and laboratory exercises to know the different soils and their physical properties. Field trips should be frequent and should be made for very definite purposes. Fertilizers should be studied and some work done in home mixing of fertilizers. The effect of plowing at the different seasons should be worked out in demonstration. The condition of the soil after growing different crops can be studied from local fields. Mulches and catch crops should be studied in the field. The plan of the field and laboratory work should be such that the work has a direct bearing on the best farm practices. At least two double periods per week should be given to field and laboratory work.

1. *Field and Project Work:* The use of the different fertilizers and manures with farm crops. Mulches; cover crops; deep and shallow plowing ground at different seasons; freezing; continued cropping; crop rotation; inoculation; soil drainage; water tables; water capacity of different soils; temperature of soils; the effect on plants of withholding certain elements; have soil analysis made and determine the fertilizers needed for certain soils. Construct soil maps of township, county, state. Plan definite rotations; visit to implement dealers and farmers to study soil machinery; visit to barnyard to investigate handling of manure.

2. *Material Needed:* Soil augers, soil thermometers, sample soil carrying case, capillary tubes, sampling tube, percolation tubes, commercial fertilizers, raw fertilizer material, supply of all soils.

For library equipment, see page 155.

FIELD CROPS.*One-half unit.*

The work in field crops should be based on some good text such as Wilson and Warburton, Livingston or Montgomery. This course correlates well with the course in soils. The laboratory should be well supplied with specimens of all the standard types and varieties of farm crops. There should be an abundance of material for judging the principal grains. If possible, practice should be given at fairs, shows and in the field to test the pupils' powers to discriminate. This work can be correlated to good advantage with the corn clubs which have been organized in the different parts of the state. Sufficient field and project work should be given to acquaint the pupil with the best farm practices.

1. *Projects:* Pure bred grain contests; growing plot of alfalfa or other legume; growing some grain adapted to locality on given area; plant grain with and without smut-results; test seed for farmers; select seed corn from fields for farmers; estimate cost per acre to farmers; growing standard crops; plan crop rotations for given farm; treat grain for smut or weevil; class or school exhibit at fairs or corn shows; grain judging contests with neighboring schools; test corn from crib, shock, stalk and rack; cover corn ears or detassel before pollen has fallen; construct grain map of township, county and state; graph relative amount of the different grains grown in the United States.

2. *Field Trips:* Observation of treatment for smut; observation of treatment for weevil; the silo; estimate loss of corn due to poor stand; selection of seed corn from field; fairs and exhibits; damage from Hessian fly or chinch bug; stored grain; the effect of fertilizers; flour mill; effect of freezing on winter crops; weeds left to go to seed.

3. *Material Needed:* Collection of grains and seed, types and breeds of principal grains and grasses, specimens of grains and grasses in the stalk, specimens of the different legumes, specimens of the sorghums, grain products, different seed germinators, grain tester, weed seeds, racks for storing seed corn, supply of grains for judging score cards, insect cages and nets, mounted insects, magnifiers.

For library equipment, see pages 154-155.

EDUCATION.*Three units may be offered.*

Full outlines of this work are found in the *Syllabus of Courses in Education for Teacher-Training High Schools*, issued by the State Superintendent of Schools. Suggestions concerning text and reference books and the regulations under which these courses are given are part of the same syllabus.

COURSE ONE.

Given during the third year.

An intensive nine weeks' study of each of the following: reading and spelling, grammar and language, geography, and arithmetic. All should be presented as material which the student will soon be teaching, method and device being emphasized.

COURSE TWO.

Given during the fourth year.

Physiology, sanitation, school hygiene, and a study of the pupil's mental capacities are given during the first half year. The second half year is devoted to school management, school law, rural school and rural life problems, and school administration.

COURSE THREE.

Given during the fourth year.

General principles of teaching, method applied to presentation of subjects taught in the rural schools, and observation lessons in these subjects constitute this course. As part of this work the *State Course of Study for Rural and Graded Schools* is thoroughly studied.

For library equipment, see syllabus mentioned above.

PEDAGOGY.

One unit may be offered.

Pedagogy should be offered only in such schools as are able to place a very strong, skillful and enthusiastic teacher in charge of the work. In general, the teacher should have the qualifications in education and experience which are required of teacher-training instructors. Successful and varied experience, a thorough acquaintance with recent educational literature, and resourcefulness in teaching are essential. A library containing at least fifty dollars' worth of modern pedagogical books should be provided. Each student who completes the full year of this subject should have the *State Course of Study for Rural and Graded Schools*, and two or more good textbooks. A brief study of psychology should be made as preparation for the more distinctly pedagogical work of management and method.

School management should include a study of school equipment and its use, school sanitation and school health, the teacher, organizing the school, government and incentives, the recitation, review, and examinations, classifications and promotion, attendance records and reports, a brief study of Missouri school administration and important sections of the law, rural school problems, such as consolidation, approved rural schools and the relation of the school to the community.

The work in method should deal with the course of study, the presentation of subject matter, and the teachers of the subjects in elementary schools with the emphasis upon the primary grades. For more detailed information concerning the course in pedagogy consult the *Syllabus of Courses in Education for Teacher-Training High Schools*, issued by the State Superintendent of Schools.

For library equipment, see pages 161-162.

COMMERCIAL GEOGRAPHY.

One-half unit may be offered.

As the history of commerce is concerned with the past of commerce, so commercial geography describes and seeks to explain the industry and commerce of nations today. It is "a comparative study of the nations of the world, their commercial prominence and their contest for the trade of the world."

The introductory work should cover: (1) the effect of surface, soil, climate, etc., that is, the physical factor of commerce; (2) the influence of race, religion, education, commercial policies, etc., that is, the human factor in commerce; (3) the effect of economic forces on production and commerce; (4) means of transportation and communication.

Following this should come a detailed study of the United States by sections and then as a whole, with reference to physical features, and climate, natural resources, population, leading industries, transportation facilities and commerce, especially foreign commerce; then a study of the outlying possessions of the United States; and finally a survey of other important commercial countries from the same viewpoint.

The textbook, supplemented by map work and assigned readings. For purposes of illustration, samples of commercial staples, lantern slides, stereoptican pictures, etc., should be freely employed, and wherever possible, visits of inspection made and informal lectures secured by experts in various industries.

Commercial geography should be preceded by physical geography, in case both are given.

For library equipment, see pages 156-157.

BOOKKEEPING.

One or one-half unit may be offered.

Note I. *The work of one unit in bookkeeping is the equivalent of that normally done in five eighty-minute periods a week for the school year.*

Note II. *The work of one-half unit consists of that normally done in five eighty-minute periods a week for one-half of the school year or five forty-minute periods a week for the entire school year.*

Note III. *Bookkeeping may not be offered in a two year high school.*

The student should become familiar with the meaning of double entry terms, with rules for debit and credit, and the kinds and uses

of books required in accounting. He should acquire the ability to keep a single entry and a double entry set of books. Furthermore, he should become familiar with such standard business forms as bills, receipts, checks, notes, time and sight drafts, endorsements, invoices, accounts sales, deposit tickets, express receipts, bills of lading, statements of account, balance sheets, etc. He should become familiar also with the forms of business letters, beginnings and endings, etc., and should know how to write and answer telegrams and advertisements.

Bookkeeping should be done largely under the eye of the teacher as laboratory work. Good penmanship, neatness in work, accuracy and speed must all be acquired in such laboratory practice. The exercises in some of the texts which are offered by the various publishers on first lessons or elementary principles would naturally form the basis for much of such work, unless the teacher prepares his own exercise work according to a similar plan. The best evidence of good work in this subject is the character of exercise work which the student can present as a result of his laboratory practice.

STENOGRAPHY AND TYPEWRITING.

Two units may be offered.

Note I. *No credit will be given for stenography and typewriting unless two units of the work are done. Two units work means five eighty-minute periods a week for two school years.*

Note II. *No credit is given for either shorthand or typewriting when taken alone.*

Note III. *No credit is allowed in stenography and typewriting if offered below the third year.*

The touch method is strongly recommended in typewriting.

The object is, first, accuracy, and second, speed in taking dictation and transcribing notes. Equally essential are correct spelling, capitalization, punctuation and paragraphing.

No credit should be given unless the following speed is attained: at end of first year, 75 words per minute in dictation and 25 words per minute on the machine; at the end of second year, 500 words in 5 minutes in dictation, and 35 words per minute in transcription of notes.

Thorough training should also be given in care of the machine, and in methods of copying, manifolding and filing papers.

The teacher in charge of this department should be a graduate of a first class high school, or the equivalent, prior to the time of making preparation to teach this work. The teacher should also have graduated from a standard business college and should have had, in addition, courses in college English and composition.

COMMERCIAL LAW.

One-half unit.

This course should not be given before the fourth year of the high school and should be given only in such high schools as maintain a commercial course. The object of the course should not be to master the technical terms and peculiar forms of procedure, but rather to acquaint the pupil with the more common principles of law which govern the every-day transactions. Much laboratory work should be given to studying and drawing up the common legal forms. Such work should be given as will enable the pupil to protect himself in ordinary business transactions. Talks by local attorneys on special phases of the law are advisable.

The following topics are suggestive: Contracts, their nature, essentials and effects; sales; interest and usury; bills and notes; agency; partnership; real property and mortgages; liens and attachments; bailments; insurance; landlord and tenant; leases; deeds.

A standard text such as Huffcut, *Elements of Business Law*; Ginn; Weed, *Business Law*, D. C. Heath & Co.; Gano, *Commercial Law*, American Book Co., should serve as a basis for the work.

MUSIC.

One unit may be offered.

One unit of credit may be given for high school music organized according to the following plan:

A. Chorus work, three periods per week. This should represent a culmination of the singing work done in the grammar grades and should supply the community and social music of the school. Three periods a week of band or orchestra practice may be substituted for chorus work.

B. Music appreciation and technical music, five periods a week. Music appreciation should deal with the historical, biographical and formal aspects of music. Its main object, however, should be to get pupils in touch with the beauties of music that they might not otherwise appreciate. The technical part of the course should deal with harmony and free composition. The pupil should acquire the ability to do the following:

1. To become proficient in sight reading.
2. To sing a selection in the key and time in which it is written, after having had the pitch "C" given to them. Either the "movable do" or "fixed do" methods may be used, or better still, the syllable "la" as disassociated from either. In the matter of difficulty, the selection should be on a par with songs found in books suitable for high school choral practices, such as Hoff's *Corona Song Book*, Ripley and Tapper's *Advanced Music Reader* (The Natural Course),

Smith's Fourth Book (The Modern Music Series), Tomlin's Laurel Song Book, The New Song Reader by C. A. Fullerton.

3. To name and qualify (perfect, major, minor, augmented, diminished) intervals struck on the piano, both in succession and combination, by other persons. The pupils should not see the keys as they are struck, but should recognize the intervals by ear. The tests as given under 2 and 3 are for the purpose of a clear recognition of tones and their symbols. Tapper's First Year Harmony.

4. To harmonize given bass and soprano, to be able to hear, think and record tone as he hears, as he would think and record words in his study of language, implying a knowledge of the primary and secondary triads in major and minor and their inversions, and of the chord of the dominant seventh with its inversions and resolutions. Tapper's First Year Harmony, or an equivalent text, should be the basis of this work.

The following distribution of time is suggested for part B of the course:

1. Music appreciation, two periods a week. This time should be devoted to lecture concerts or recitals after the plan of W. S. B. Matthews in "How to Understand Music," or as suggested in "A New Correlation," Victor Talking Machine Company. Outside reading should be assigned and work required the same as in other high school classes.

2. Harmony, two periods a week. The ground covered should be the equivalent of Tapper's First Year in Harmony.

3. History of music, biography, etc., one period a week.

For a list of required library books, see pages 159-161.

DRAWING.

Two units may be offered.

The work of one unit in drawing is the equivalent of that normally done in five eighty-minute periods a week for the school year.

The outline below, recently adopted by the North Central Association of Colleges and Secondary Schools, indicates the nature of the work which should be included in the two units of Drawing. While the work is not separated here into a *first* and *second year*, the more elementary forms of each phase of the subject should be selected for the *first year*. Approximately one-third the time should be given to representative drawing and two-thirds to decorative composition, constructive and decorative design, construction and applied design.

The outline is as follows:

Pictorial.—Plant study (flowers, sprays of leaves, seeds, pods, etc.). Object study. Landscape (roof studies, buildings, etc.) Pose drawing. Composition.

Decorative Composition.—Plant forms, object study, landscape, pose.

Decorative Design.—Plant analysis (for the purpose of design). Conventionalized plant forms. Decorative units, borders, surfaces, corners, rosettes, posters, book covers, etc. Stencils, wood-block

printing. Historic ornament. Arrangement of straight lines, and of straight and curved lines. Geometric design. Lettering, illuminating. Schemes for interior decoration.

Constructive Design.—Designs for pottery, leather, metal, bookbinding, furniture, cardboard construction, textiles, etc.

Crafts.—Pottery, leather work, metal work, bookbinding, furniture (choice of one or more of the above crafts).

Applied Design.—Design applied to the crafts and to cardboard, textiles, etc.

Illustration.

Talks on history and industry of art, on civic planning, domestic architecture and decoration.

Instrumental drawing to be given as needed to meet the requirements of practical designing and construction.

Note.—Mediums used: pencil, charcoal, water colors, crayons, brush and India ink, and a combination of the pure mediums.

It is desirable to accentuate the life interest in these subjects as well as the technical achievement. Taught from the standpoint of their social interest, these topics may be made of great benefit in the adjustment of the student to social life. For example, in constructive design the problem of the house could be studied from the viewpoints of convenience, suitability, cost, appearance, etc. Under decorative design, schemes for the interior decoration of one or more rooms in the individual pupil's house (as planned above) could be worked out. This idea might be extended to embrace business houses, factories, etc. The pictorial composition could deal largely with the industrial occupations of man, with sketch and pose work made tributary to this end. Complete expression is to be sought; and, whenever possible, the problem should be approached from the side of its relation to the life of the student.

MANUAL TRAINING.

Two units may be offered.

A unit in manual training or mechanical drawing is the equivalent of that normally done in five eighty-minute periods a week for the school year.

A two-unit course in woodworking is outlined and one unit course in mechanical drawing. In the larger high schools these two subjects are offered separately. In the smaller high schools a correlated course in woodworking and mechanical drawing will perhaps be found more advantageous.

WOODWORKING.

First unit.

In the outline, given below, of a one year course in woodworking, the work has been arranged in groups. Each group contains a number of problems involving the same process. The arrangement provides for the uneven progress of the class, and the teacher is able to keep all members of the class engaged on the same type of work, although working on different objects. A number of sup-

plementary exercises should be provided. The student may be permitted to make almost any object which involves the processes or principles of the group in which the class is working. The subject matter is indicated under the heading "Processes."

If mechanical drawing is correlated with the woodworking, the amount done under each group will necessarily be less than if woodworking were taken alone and the corresponding amount of work should be done in the mechanical drawing.

In taking the course outlined, the student should learn the following:

With reference to *tools*.—(1) To use the rule in measuring and dividing spaces. (2) How and when to use knife and pencil in laying out work. (3) To use dividers or compasses to draw arcs or divide spaces. (4) To use try-square to lay out work and to test work. (5) To use, adjust and sharpen jack plane and block plane. (6) When and how to use cross-cutting saw, rip saw and back saw, together with a knowledge of the distinguishing characteristics of these saws and the reasons for these differences. (7) To use and sharpen chisels. (8) To use hammer and nail set. (9) To use screw driver and countersink for setting screws. (10) To use brace and bit, and also how sizes of bits are designated. (11) How and when to use spoke-shave, file and sandpaper. (12) To use gouge. (13) To name all of the tools used.

With reference to *processes*.—(1) To make, mark and use a working corner. (2) To take proper steps in making a board a given length, width and thickness. (3) To detect direction of grain and use this knowledge. (4) To lay out and bore a hole through a board. How to bore to depth. (5) To plane a surface true. (6) To lay out and make a chamfered corner. (7) To lay out and make a rounded corner. (8) To make a "butt" joint. (9) To lay out and make properly a housed or dado joint. (10) To lay out and make properly a cross-lap joint. (11) To lay out and make properly a "mortise and tenon" joint. (12) To make a glue joint. (13) To lay out and make miter joint. (14) To construct a panel. (15) To apply simple finishes.

The outline is as follows:

Group I. Giving the first use of the saw and the laying-out tools, such as the gage, try-square and rule.

Processes.—Measuring, squaring, gaging, sawing, boring, making dowel.

Problem. Game board, counting board, laundry list, puzzle, etc.

Group II. Emphasizing the first use of the plane.

Process.—Planing: surface, edge, to dimensions, chamfering.

Problem.—Swing-board, hat rack, bread cutting board, etc.

Group III. Teaching the first use of the chisel.

Processes.—Vertical chiseling, gouging, paring, sharpening chisel.

Problem.—Shelf and brush-rack, tray, sleeve-board, etc.

Group IV. Involving "form-work" and the first use of the spoke-shave.

Processes.—Bow-sawing, modeling, sand-papering.

Problem.—Coat hanger, tool handle, canoe paddle, etc.

Group V. The construction of objects by means of some form of the groove joint.

Processes.—Housing, halving, nailing, carving, finishing.

Problem.—Waterwheel, test-tube rack, book-rack, flower-pot stand, loom, sled, box-trap, bracket-shelf, knife-polishing board, towel roller, etc.

Group VI. More exact work in planing in order to make a glue joint.

Processes.—Planing joints, gluing, clamping.

Problem.—Bread-molding board, drawing board, bench-hook, etc.

Group VII. Construction by means of the mortise-and-tenon joint.

Processes.—Laying out duplicate pieces, cutting a mortise, sawing tenon, finishing.

Problem.—Stool, plant-stand, taboret, umbrella rack, table, etc.

Group VIII. Construction involving the mitre joint.

Processes.—Planing parallel edges and sides, use of miter-box, laying out brace.

Problem.—Mitre-box, framing a picture, box, bracket, etc.

Group IX. Elementary cabinet making involving the use of panel.

Processes.—Plowing, fitting, putting on hinges.

Problem.—Sewing cabinet, music cabinet, plate-rack, screen, book-case, etc.

NOTE I. The teacher should be familiar with the amount of time necessary to construct a given article and should insist that the pupils make this article in this given length of time with a reasonable degree of accuracy. In too many courses the time element is neglected. Pupils are allowed to take an unreasonable length of time to make an article. This tends to decrease their efficiency rather than increase it, and is a handicap to them if they wish to enter a commercial establishment or a vocational school. No work is worth doing if it cannot be done in a fair length of time. It is suggested that the teacher keep a record card in every project for the individual pupils. This card should show the nature and amount of material used and the time spent in completing the project.

WOODWORKING.

Second unit.

The second unit in woodworking should be chiefly in furniture and cabinet making. In this connection the source of the various woods of commercial value should be studied. The chief characteristics of the various kinds of wood and commercial uses of same should receive proper attention. The seasoning of woods, the different ways of sawing woods and reason for same should be studied, also the commercial value of different woods. The pupils should study and criticize the various styles and designs of furniture so as to distinguish between good and bad design. If such a thing is possible, inspection trips should be made to furniture factories so that the pupils may become familiar with the various methods used in the construction of furniture on the commercial basis. A more detailed study should be made of the various finishing processes; the nature and composition of various fillers, varnishes, glues, etc.

Working drawings should be made of all pieces of furniture or cabinets before the actual bench work is begun.

While the chief work in the second unit of woodworking should be bench work in the making of furniture and cabinets, wherever possible some time should be given to woodturning and at least from one to three turning lathes should be installed in the work shop.

No definite detailed outline of the second year's work is here attempted.

In general, the following course should be pursued:

a. Begin by designing and constructing some piece of simple furniture. Before beginning the bench work make working sketches and then the complete mechanical drawing from the sketches. Suggested objects for construction: magazine rack, umbrella rack, stool, window box, etc.

b. Design and construct a more difficult piece of furniture, working in the mortise and tenon joint: Objects, table, big chair, etc.

c. Design and construct a piece of furniture involving panel and drawer construction. Wall cabinet, music cabinet, buffet, etc.

d. In the construction of chairs give some attention to upholstery; the various materials used for such. If possible get pupils to upholster some piece of old furniture.

e. (a) Under woodturning study structure, care and use of lathe. (b) Application of technique involved should be applied by working out such objects as mallet, rolling pin, bat, dumb-bell, Indian club, napkin ring, etc. (c) If possible, make use of woodturning in combination with bench work in construction of some simple piece of furniture.

A good deal of liberty should be allowed pupils in the selection of the pieces of furniture which each wishes to construct. Preferably such things should be made as are needed in the school or in the home.

Whatever mechanical processes are used in this work should be in keeping with the best industrial practices of the day and no high school should attempt the second year's course in woodworking unless machinery such as a jointer, planer, combination saw machines, etc., can be provided, thus approximating actual shop conditions.

For library equipment, see page 157.

For shop equipment, see pages 109-111.

MECHANICAL DRAWING.

One unit may be offered.

A unit in mechanical drawing is the equivalent of the work normally done in five eighty-minute periods of work for the school year.

The unit of mechanical drawing may be offered as a separate subject under manual training. In some high schools, however, it may be more advantageous to correlate mechanical drawing with woodworking. If mechanical drawing is so correlated with the shopwork the introduction of the mechanical drawing subject matter in an orderly manner should not be sacrificed to meet such correlation. By proper selection and arrangement, working drawings may be made the means of introducing the various steps in mechanical drawing.

The outline given below is not intended as a detailed course in the subject but is merely an outline to show about what should be covered in one year's work.

I. *The use of the drawing instruments.*—Pencil; the T-square; the triangles; the ruling pen; the compasses; the dividers; the scale; the curve ruler, etc.

II. *Working knowledge.*—To fasten paper to board; precautions to insure neatness; arrangement; rapid drafting; penciling; inking; erasing; laying off measurements; conventional lines; lettering the drawing; the use of colored inks; to mix India ink; line-shading; parallel line shadows, etc.

III. *Constructive geometry.*—Bisection of line; drawing perpendiculars to any point in a line; dropping perpendicular from a point to a line; to divide a line into equal parts; bisect an angle; construct an angle equal to a given angle; construct triangles when various parts are given; describe an arc or circumference through 3 given points not in same straight line; to inscribe a regular hexagon and pentagon in a circle; to draw a line tangent to a circle at a given point on the circumference; locate centers; plot an angle; draw false ellipse; true ellipse; parabola.

IV. *Freehand and mechanical lettering.* Placing; form; slant spacing; stroke.

PROJECTION.

Note I.—In the following H stands for horizontal and V for vertical.

V. *Orthographic Projection*.—Definition; angles of projection; views, different terms; how the views are determined; ground line; to represent the planes of projection; the relative positions of different views; solids in orthographic projection.

Application:

Cylinder—Axis parallel to H and V; plane parallel to V.

Cylinder—Axis perpendicular to H; plane parallel to V.

Sphere—Plane parallel to V.

Sphere—Plane perpendicular to H; at angle with V.

Square Prism—Base parallel to H; plane perpendicular to V, at angle with H.

And other exercises.

Intersections of surfaces:

a. Two cylinders; b. Cylinder and sphere; c. Cylinder and cone, etc.

Shadows:

Shadow of a square prism on H and V.

Shadow of a cylinder on H.

Shadow of two blocks on H.

And other exercises.

VI. *Isometric Projection and Cabinet Projection*. Fundamental principles—axes; non-rectangular objects in isometric projection; isometric scale, circles in isometric; irregular curves in isometric, shadows in isometric.

Cabinet Projection.—Fundamental principles, axes; rules for cabinet projection; circles in cabinet projection; oblique projection; isometric and cabinet projection compared; advantages and disadvantages of isometric and cabinet projection.

VII. *Perspective*.—Perspective drawing defined; picture plane; point of sight; lines in special position; horizon; points of distance; vanishing points, etc.

VIII. *Working Drawings*.—Card file; book case; buffet; drawing desk; work bench; table; parts of machinery, etc.

IX. Pupil should understand the process of blue printing and should make a blue print of one or two of the large working drawings.

For laboratory equipment, see page 112.

For library equipment, see page 158.

HOUSEHOLD ARTS.

Two units to be offered.

One unit may be offered, composed of the most important portions of the two units given below, or each of the units mentioned below may be offered individually.

The work of one unit in household arts is the equivalent of that normally done in five eighty-minute periods a week for the school year.

COOKING.

One unit.

A unit in cooking should consist of (1) a study of the production, manufacture and composition of typical foods, their classification according to the food principles contained therein, and the study of the relaxation of these to the needs of the body; (2) a study of the fundamental scientific principles underlying the cookery processes and their application in the cooking of typical foods; (3) a study of the principles involved in the cleaning and caring for the various sorts of utensils and materials found in the kitchen.

Owing to the fact that the course in cooking has not yet been definitely standardized, a detailed outline, which represents the work done in some of the best high schools, is given. The teacher, in order to adapt it to local conditions, should judiciously make eliminations and additions, and should modify the order and emphasis.

The outline is as follows:

The Kitchen.

Recitation.—(1) Shape and size. (2) Equipment: desk and individual equipment; cupboard and group equipment; sinks and supply tables; refrigerator; burners and ranges. (3) Care of kitchen: reason for cleanliness; means of securing cleanliness; importance of order and system.

Laboratory work.—(1) List and care for articles in desk. (2) Clean and conveniently arrange cupboards. (3) Care of sinks and supply tables by different girls—housekeepers. (4) Clean refrigerator. (5) Wash dishes and towels. (6) Care for burners and ranges. (7) Read gas meter. (8) Calculate cost of gas per hour. (9) Probable cost in home.

Fuels and their Combustion.

Recitation.—(1) Kinds and classes. (2) Value of different fuels; calorific; economic; as to convenience. (3) Essentials of combustion. (4) Meaning of kindling point. (5) Products of combustion. (6) Causes and effect of incomplete combustion. (7) Need for extraordinary ventilation of kitchen. (8) Different kinds of gas, carefully studied. (9) Study matches.

Laboratory work.—(1) Note effect of closed and open mixer of burner; closed and open drafts of stoves. (2) Comparison of various methods of supplying oxygen for combustion. (3) Ventilate kitchen and class room. (4) Compare different types of burners.

Water.

Recitation.—(1) Kinds and composition. (2) Use as a cleaning agent; use as a medium in cooking; uses in the body. (3) Purification of water, including household methods. (4) Treatment of hard waters.

Laboratory work.—(1) Determine temperature of water when small bubbles begin to rise; when larger bubbles rise and break at the surface; when the whole surface is agitated. (2) Determine temperature of steam. (3) Determine temperature in double boiler.

(4) Determine source of home and school water supply. (5) Soften water for cleaning. (6) Filter water through various mediums.

Fruits.

Recitation.—(1) Uses of various grades of fresh fruits. (2) Composition and value as food. (3) Processes of preparing fresh fruits. (4) Decay of fruit: cause and prevention of decay; means of destroying micro-organisms; resistance of spores. (5) Methods of preserving fruits and vegetables: sorting; cleaning; storing; drying; sterilizing; use of sugar, spices, vinegar; low temperature; cold storage; fraudulent and harmful preservatives. (6) Uses of preserved fruits. (7) Comparison of fresh and preserved fruits and vegetables as to cost; as to food value. (8) Food laws governing sale of fresh and preserved fruits and vegetables. (9) Reading and interpreting all food labels.

Laboratory work.—(1) Sort fruit for different purposes. (2) List fruits according to water content. (3) Cook fruits in various ways as boiling, baking, stewing, scalloping. (4) Observation of decay and mold of fruit. (5) Examination of bacteria and mold under microscope. (6) Determine conditions favoring and retarding growth of micro-organism. (7) Can fruit and vegetables by different methods. (8) Preserve and pickle. (9) Extra sterilization. (10) Make jellies, butter, jams, etc. (11) Cook dried fruits; compare weight of fruit before and after soaking. (12) Make list of groceries which protect fruits from street dirt.

Vegetables.

Recitation.—(1) Composition. (2) Classes: according to part of plant used; according to composition; according to flavor.

Laboratory work.—(1) Preparation of different classes of vegetables—tomatoes, cabbage, potatoes, carrots, turnips, onions. (2) Different methods as boiling, steaming, stewing, creaming, baking, scalloping, sauteing. (3) White sauce for different purposes. (4) Cream soups. (5) Examine section of potato to see starch cells. (6) List ways of preventing lumping of starchy materials. (7) Determine thickening power of different starchy materials. (8) Use iodine test on different starchy foods. (9) Dextrinize flour—make toast, croutons, etc.

Starch.

Recitation.—(1) Structure and composition. (2) Various theories as to starch cell. (3) Properties: effect of moist and dry heat; effect of acids; tests for starch. (4) Digestion and value as food. (5) Method of cooking as related to composition. (6) Value of vegetables in the diet.

Cereals.

Recitation.—(1) Composition. (2) Value as food. (3) Structure. (4) Manufacture. (5) Kinds: comparative value and cost. (6) Effect of different methods of cooking on flavor and digestion. (7) Predigested cereals.

Laboratory work.—(1) Cook different kinds of cereals by different methods, using fireless cooker, if possible. (2) List amounts of different cereals that ten cents will buy; fruit combinations.

Sugar.

Recitation.—(1) Source, kinds and composition. (2) Manufacture of sugars and syrups. (3) Properties: effect of heat; moisture; dryness; effect of acid. (4) Digestion and value as food; danger of excess. (5) Adulteration of confectionery. (6) Glucose.

Laboratory work.—(1) Make syrup test with thermometer. (2) Make peanut brittle, fondant, caramel. (3) Make syrup, frosting, marguerites. (4) Make fudge, creams. (5) Figure cost of homemade and purchased candies. (6) Trip to candy factory or kitchen, if possible.

Milk.

Recitation.—(1) Composition. (2) Value as food: value of casein; importance of nitrogen; nutritive value for young and adult. (3) Effect of heat: effect of high temperature in making cottage cheese and junket; relation of temperature of cooking to digestion; effect of pasteurizing and sterilizing on nutritive value and flavor. (4) Effects of acid, rennet, bacteria. (5) Care of milk: importance of cleanliness and low temperature; milk as a carrier of infection; dangers of old milk. (6) Milk as found on the market: modified, certified, condensed, and slightly condensed, malted, pasteurized, etc. (7) Factors in cost of milk. (8) Milk products. Effect of cleanliness and temperature on flavor. (9) Food laws concerning milk and milk products; inspection of dairies and wagons.

Laboratory work.—(1) Separate milk into its parts. (2) Make: butter; cottage cheese; junket; cocoa. (3) Sour milk and its uses. (4) Skimmed milk, cost and use. (5) Compare scalded and boiled milk. (6) Visit a good dairy, if possible. (7) Investigate school and home milk supply.

Cheese.

Recitation.—(1) Composition. (2) Manufacture and kinds: value of bacteria and molds in producing flavor. (3) Digestion and value as food.

Laboratory work.—(1) Make a collection of various cheeses.

Eggs.

Recitation.—(1) Composition. (2) Value as food: importance of albumin. (3) Structure. (4) Preservation: cause of decay; methods of preserving; means of testing. (5) Effect of heat and methods of cooking. (6) Economy in use of eggs; cost in different seasons; substitutes for eggs; commercial abuses. (7) Combinations: milk, eggs, cheese.

Laboratory work.—(1) Preserve eggs for winter use. (2) Test eggs for freshness. (3) Determine effect of different temperatures on eggs. (4) Cook eggs in different ways: soft and hard cooked; poached; omelets. (5) Determine cost of egg dishes at different seasons. (6) Invalid dishes. (7) Make custards, rarebits, souffles, macaroni, rice and potatoes with cheese.

Meat.

Recitation.—(1) Structure. (2) Composition and nutritive value. (3) Selection of meat: freshness, age and condition of animal;

location and cost of cuts; suitability of cut to purpose. (4) Flavor of meat; importance of extractives; ripening of meat. (5) Effect of heat: on connective tissues and walls of tubes; on juices or contents of tubes. (6) Reasons for cooking. (7) Methods of cooking: tender and tough cuts; retention of juices by searing. (8) Extraction of juices by soaking, etc. (9) Breaking up of connective tissues by cutting or grinding. (10) Removal of connective tissue by scraping. (11) Softening connective tissues by long, slow cooking in water. (12) Special methods of preparing and cooking veal, mutton, pork, poultry, fish and special organs. (13) Use of left-overs: suitable combinations of flavor; dangers of food poisoning from stale meat. (14) Preservation of meat and uses of preserved meats; cold storage, canning, use of preservatives; relation of preservatives used to method of cooking. (15) Cost of meat: of different cuts and animals; at different seasons; as compared with meat substitutes. (16) Food laws concerning fresh and preserved meats.

Laboratory work.—(1) Scrape tough and tender meat to determine structure and cause of toughness. (2) Experiment with meat to determine some of the constituents and their characteristics. (3) Examine cuts of meat used: as to location of bone; amount of fatty tissue; color and grain of muscle. (4) Make drawing of animal, showing location of cuts. (5) Visit meat market, if possible. (6) Preparation of tender cuts: broil; roast. (7) Preparation of tough cuts: make meat stock, various stock soups, beef juice, beef tea; make Hamburger or loaf; make scraped meat sandwiches or meat balls; make pot roast, stew or fricassée. (8) Prepare veal, mutton, pork, poultry and fish, including oysters: different methods as sautéing, roasting, stewing, frying, creaming. (9) Make dressing for roast. (10) Make sauces for serving. (11) Use left over meat in various ways, as scallop, meat pies, hash, sandwiches, etc. (12) List vegetables and seasonings that go well with different meats. (13) Cook bacon, "boiled" ham, corned beef, etc. (14) List cuts of meat according to price. (15) List foods that might be substituted for meat in the diet. (16) Meat extracts.

Fish.

Recitation.—(1) Sources and kinds. (2) How judged. (3) Dangers of old fish. (4) Preserved fish.

Laboratory work.—(1) Cook fish in various ways. (2) Sauces: hollandaise, tartar, egg.

Gelatin.

Recitation.—(1) Source. (2) Commercial preparation. (3) Properties. (4) Composition. (5) Value as food: in carrying flavor; in furnishing nourishment; function in the body.

Laboratory work.—(1) Make gelatin from meat and bone. (2) Make gelatin preparations using commercial gelatin: plain gelatin, charlottes, etc. (3) Compare fruit gelatin with "ready to use" preparations.

Legumes and Nuts.

Recitation.—(1) Composition. (2) Value as food: use as meat substitutes; digestion of.

Laboratory work.—(1) Baked beans. (2) Dried pea or lentel soup. (3) Salted almonds and peanuts. (4) Collection of nuts in natural cases.

Fat.

Recitation.—(1) Composition. (2) Value as food; function in the body; digestion of fat and foods coated with fat. (3) Kinds, source, form. (4) Structure of fatty tissue. (5) Application of heat: danger of accidents in frying, from combustion of fat, from expansion of moisture; means of preventing fat soaking; scorching of fat. (6) Economy in using fat: cost of various kinds; butter substitutes for cooking; lard substitutes. (7) Food laws concerning various fats.

Laboratory work.—(1) Render fat. (2) Determine temperature for frying cooked and uncooked materials. (3) Fry cooked and uncooked foods; use different fats. (4) Clarify fat. (5) Use partially decomposed fat for soap making. (6) Recognition of oils: olive, domestic and foreign; cotton seed oil; use of lard substitutes.

Batter and Doughs.

Recitation.—(1) Flour: composition; kinds and classes, according to composition, according to process of manufacture, according to grains used; value of the different classes, as food, for bread making. (2) Leavening agents and their action: air and steam, effect of heat, importance of elasticity of white of egg and gluten; carbon-dioxide, action of soda with sour milk, molasses, cream of tartar; action of baking powder, different kinds, effect of heat and moisture; action of yeast, different kinds, conditions favorable and unfavorable to growth, products of fermentation.

Laboratory work.—(1) Determine main constituents of flour. (2) Determine properties of gluten and make gluten balls. (3) Visit flour mill, if possible. (4) Determine tests for different oven temperatures. (5) Make sponge cake and popovers. (6) Make cereal griddle cakes, muffins, cakes, biscuits, pastry, steam puddings. (7) Determine effect of combining soda with sour milk, soda with cream of tartar and baking powder with moisture. (8) Determine suitable temperature and food for yeast. (9) Compare flours and discuss varying results in gluten content. (10) Compare various national breads.

Bread.

Recitation.—(1) Methods of making: materials used. (2) Relation to kind and condition of yeast. (3) Amount and kind of flour. (4) Reasons for kneading. (5) Relation of temperature and amount of yeast to time. (6) Baking: time and temperature; changes produced. (7) Care of bread after baked. (8) Souring and other undesirable changes in bread. (9) Comparison of home-made and baker's bread: need of standard; digestion of yeast breads, quick breads and toasts, nutritive value and cost of bread.

Laboratory work.—(1) Bread making: short and long process; plain, whole wheat, graham, rye; plain and fancy rolls; bread with nuts or raisins. (2) Judge bread. (3) Visit bakery, if possible. (4) Determine cost of bread made. (5) Make toast, croutons,

sandwiches, etc. (6) Macaroni and similar products. (7) Noodles.

Salads.

Recitation.—(1) Value in diet: as nourishment; as an appetizer; for furnishing variety; for the mineral of fresh fruits and vegetables; economic value. (2) Preparation: importance of freshness and crispness; importance of thorough washing of uncooked foods; importance of attractiveness in arrangement of color, form and texture, size of service, garnish; suitable combinations; considering flavor; food nutrients; digestion.

Laboratory work.—(1) Select materials for salads. (2) Prepare materials for salads; salad plants; other materials, as spring fruits and vegetables, winter fruits and vegetables, meats, nuts, eggs and cheese, left-overs; cooked French and Mayonnaise salad dressings. (3) Attractively arrange materials. (4) Determine cost of salads made. (5) An exhibition of salads.

Frozen dishes.

Recitation.—(1) Value of frozen dishes. (2) Freezing; cause of freezing; construction of freezer; uses of fireless cooker.

Laboratory work.—(1) Care of freezer. (2) Make water ices, sherbets, ice cream and mousse. (3) Determine temperature of freezing mixture and frozen material. (4) Determine cost of desserts made. (5) Improvise freezer for individual use.

Beverages.

Recitation.—(1) Tea, coffee, cocoa, chocolate: important constituents; methods of preparation; buying, and care in the home; substitutes; physiological effects. (2) Fruit drinks: value of the diet, in sickness and health; kinds; national habits. (3) Special preparation for the sick: discussion of varying conditions and consequent needs; other methods of feeding.

Laboratory work.—(1) Make tea and coffee; compare steeped and boiled tea and coffee. (2) Make cocoa and chocolate. (3) Make fruit drinks. (4) Make preparation used in liquid and semi-liquid diet. (5) Prepare invalid's tray. (6) Broths: stimulating preparations like beef juice, meat extracts, etc.; gluten breads; liquid egg foods; plain diets; uses of milk.

Summary.

Recitation.—(1) Definition of food. (2) Classification of food according to food principles. (3) Temperature suitable for each class. (4) Digestion and assimilation of each class. (5) Value of food and food requirements: function of each class; comparative value of different foods; food value represented by calories; food requirement represented by blocks, figures or charts; food requirements for people of different ages and occupations; national and foreign investigations; dietary standards of various investigators. (6) Importance of purity of food. (7) Cost of food: comparative cost of different classes of food; cost of food at different seasons; relation of cost of food to total cost of living and to income.

Laboratory work.—(1) Review notebooks. (2) Make classification of foods studied: list foods according to their protein fat and carbo-hydrate content; list foods rich in the different kinds of mineral

matter. (3) Weigh portions of food that are equivalent in total nutrients, total protein, or that yield 100 calories, or that represent a Chittenden or Atwater meal. (4) Compare cost of different cooking lessons during the year.

SEWING.

One unit.

A unit in sewing should consist of (1) a study of the production and manufacture of the textile fabrics (cotton, wool, flax, silk), and methods of detecting the more usual forms of adulterations; (2) laboratory work in sewing, which should include handwork and machine stitches as applied to household articles and clothing, the drafting of patterns for undergarments and waists, and the use of commercial patterns; (3) consideration of such problems as fitness of garment to purpose, color harmonies in dress, cost of the home-made garment versus the factory-made garment, etc.

As in the case of cooking, the course in sewing has not as yet been definitely standardized, and therefore a detailed outline, which represents the work done in some of the best high schools, is given. The teacher, in order to adapt it to local conditions, should judiciously make eliminations, and should modify the order and emphasis.

The outline is as follows:

Equipment for Sewing.

Recitation.—(1) Equipment needed for hand sewing. (2) The workbox and its contents. (3) Construction and care of sewing machine. (4) Suitable chairs and tables. (5) Lighting of the room.

Laboratory work.—(1) Select and list price of individual sewing equipment. (2) Clean, oil, understand and use machine and attachments.

Use or Purpose of Clothing.

Recitation.—(1) Fulfillment of purpose: under and outer garments. (2) Suitability of clothing for various occasions, such as business, home, sick room. (3) Clothing in relation to health: effect of too little and too much clothing; effect of pressure; loosely and closely woven fabrics non-porous clothing.

Laboratory work.—(1) Collect references to and pictures of clothing of primitive and modern times. (2) Possible trip to store to see fabrics and garments. (3) Criticise own clothing on basis of purpose. (4) Plan clothing for various seasons and occasions.

Materials used.

Recitation.—(1) Cotton, wool, flax, silk: structure and composition; effect of heat, acids, alkalies, moisture, light; conductive and absorptive properties of the different fibres; suitability of each for under and outer clothing; manufacture of the fibers into clothing; bleaching, dyeing, printing, mercerizing. (2) Use of uncommon fibers such as jute, ramie, pineapples, cocoanut, vegetable silk. (3) Leather, fur and rubber as materials for clothing.

Laboratory work.—(1) Collect samples of raw materials. (2) Examine fibers. (3) Test samples to determine quality; fiber or fibers present, closeness of weave, adulterants. (4) Determine characteristics of warp and woof of cloth. (5) Make textile collections, illustrating the variety, quality, price, possible use and enduring probabilities, under test of elements, chemicals, and laundering of finished products of different fibers.

Selection of Materials for Class Use for Articles or Garments.

Recitation.—(1) Purpose, cost, durability. (2) Width, amount, allowing for shrinkage. (3) Color, design, weave and finish. (4) Genuineness, quality. (5) For trimming: comparative value of hand and machine work; desirable qualities for trimmings, including good edge and simple design; kinds of embroidery, laces, drawn work, etc.; harmony of material and trimming in quality and color; inappropriateness of color in trimming undergarments.

Laboratory work.—(1) Examine samples and discuss suitability. (2) Combine samples of textile fabrics to show suitable color, quality and finish for suits for different occasions and individuals. (3) Buy materials for articles to be made. (4) Select trimmings, thread, etc. (5) List cost of materials. (6) Study design in embroidery, laces and other ornamentation.

Selection of Design for Making.

Recitation.—(1) Purpose of article. (2) Form and size of individual. (3) Personality and occupation of individual. (4) Artistic effect: good lines; good color combinations; effect of light on materials of various color, quality, finish. (5) Time and money to expend on making and laundering. (6) Examine ready-made garments in forms, workmanship, material, cost. (7) In cost of production, ascertain expense, profit in labor, in equipment, in capital. (8) Determining cost to class of materials; time consumed. (9) Compare result with shop article of same cost; and cost with shop article of same quality. (10) Summarize data and comment thereon.

Laboratory work.—(1) Make design for garments. (2) Take measures. (3) Draft patterns. (4) Compare and use drafted and bought patterns. (5) Criticise designs for clothing in magazines and papers. (6) Small articles of attire, conveniences for travel, for desk, room or house; the dressing of a doll for some needy child; the making of a garment for a child in need. (These ought to be made by a group of students together; the work should be dainty and parts regarded in relation to the whole. Beauty of effect should be ensured through simplicity in design and excellence of workmanship, even with crude or commonplace materials.) (7) Process in work: pattern placed together, examined in comparison with one blocked earlier; material examined for warp, woof, lengthwise, crosswise, bias, selvage; implications, comfort in wearing, hanging well and retaining shape and laundering; discuss and illustrate types of seams and finishings, select in accordance with purpose;

cut, baste, sew, finish, examine; state in writing judgment of work and disclosed needs of worker.

Cutting.

Recitation.—(1) Economy. (2) Matching patterns in cloth.

(3) Arrangement of pattern with weave.

Laboratory work.—Cut out garments.

Making.

Recitation.—(1) Characteristics of good workmanship in the making of garments or articles.

Laboratory work.—(1) Keep materials and hands clean while sewing. (2) Baste, fit, stitch and finish undergarments as drawers, underwaist and skirt or gown. (3) Make suitable seams, bands, bindings, facings, corners. (4) Make tucks and put on trimmings. (5) Make shirt waist and wash dress. (6) Possibly make wool skirt.

For laboratory equipment, see pages 112-114.

For library equipment, see pages 158-159.

SUGGESTIONS FOR EQUIPPING LABORATORIES.

GENERAL INFORMATION.

1. An inventory of laboratory supplies should be taken at the close of the term to guide the superintendent and board in estimating the amount needed for the following year. Unnecessary damage and waste resulting from carelessness should be charged to those responsible for the loss.

2. Orders for apparatus and supplies for the year's work should be placed as early as possible during the summer so that the material will be on hand at the beginning of school. Much time is wasted in science instruction by not having the material when it is needed.

3. It is better to equip well for a few sciences than to attempt more and sacrifice the quality of the work. When only one science is offered, in most cases it should be agriculture. A unit in agriculture is now required for state aid. Schools teaching agriculture should have at least the minimum equipment listed in this manual. First class high schools must offer two or more units in science.

4. It is not possible for one person to meet as many classes a day in the laboratory as in the recitation room. If the quota of work for each teacher is six recitations a day, the teacher of science should not be expected to have more than four. Careful preparation for each laboratory exercise is indispensable. Few things in a classroom are more pleasing and more instructive than a well executed and successful experiment, and few things are more disastrous than the failure of a demonstration.

5. The laboratories should be on the north side of the building, and the length of the room from east to west should be made much greater than the breadth from north to south, as it is desirable to have as much north light as possible. In the work in physics, sunlight may often be used to advantage, and it is well to have one or two windows exposed to the sun. In the construction of a new building, it is important that the windows should be high, running up to the ceiling. The rooms should not be so deep as to render it difficult for light to get readily across. The distance from the top of the

window sills to the floor should be the same as the height of the laboratory tables. Too great care cannot be exercised to secure perfect ventilation.

6. The classroom for the recitations in either physics or chemistry should be near the laboratory. This room should have a demonstration table at east eight feet long, with both water and gas connections. If electrical power is available, the room should be wired for a lantern. Even if no lantern is available, the room should be curtained with opaque enameled cloth shades so that it can be darkened. The following lists do not contain all that a well equipped first class high school should have. They are intended as a guide for those districts that do not already have well equipped laboratories.

7. The following lists of apparatus for the various sciences are given to show what should be secured and to furnish an estimate of the approximate cost of equipping for any one of the sciences. Following each list are given the addresses of several reliable firms from whom the material may be purchased. An attempt has been made to revise the prices of the various pieces of apparatus as nearly as possible in accordance with net market prices at the time of the publication of this course. *Boards of education, however, should consider these prices merely as estimates or approximations since under present unstable market conditions prices on scientific apparatus fluctuate and in many items there may be a great difference in price at different times.* It is always best to ask two or more firms for bids on the apparatus desired. In this way from 10 to 15 per cent can usually be saved.

PHYSICS.

In equipping for physics it is first necessary for the teacher to select the laboratory manual and list of experiments to be performed so that the apparatus purchased will fit the course. Under the instruction of a resourceful teacher some of the apparatus can be made by the students.

FOR TEN STUDENTS WORKING AT A TIME.

MECHANICS AND PROPRIETORS OF MATTER.

5 rulers with protractors on back, 30 cm.	\$.15
5 meter rods, with brass tips.	1.75
8 oz. annealed iron wire, No. 24, on spool. . . . .	.30
4 oz. spring brass wire, No. 27, on spool. . . . .	.32

4 oz. spring brass wire, No. 24, on spool	\$.28
8 oz. copper wire, bare, No. 32 . . . . .	.45
4 spring balances, English and metric, flat back, 8 oz.	3.20
4 spring balances, English and metric, flat back, 64 oz.	2.00
6 pine rods, white, 102x1x1 cm. . . . .	.36
6 pine rods, white, 102x2x1 cm. . . . .	.42
2 sets iron weights, universal, 1,000 grams to 10 grams	4.50
4 mounted uprights, 10 cm. scales, divided in mm. . . . .	.68
12 hardwood prisms . . . . .	.60
1 each steel balls, $\frac{1}{4}$ " and $\frac{3}{8}$ " diam. . . . .	.09
5 single pulleys . . . . .	.80
1 steel rule, 20cm. long, graduated in mm. and inches . . . . .	.90
1 jolly balance, all metal	5.00
1 torsion apparatus, complete with rods	12.00
1 micrometer caliper, metric, friction head	4.00
1 vernier caliper, English and metric, inside and outside and depth gauge	2.85
1 spherometer, reading to 1/100 mm.	3.00
1 triple beam balance, aluminum beams	12.00
1 metal cylinder, iron, about 50 mm. long, 12 mm. diam. . . . .	.15
1 metal cylinder, brass, about 50 mm. long, 12 mm. diam. . . . .	.15
1 metal cylinder, aluminum, about 50 mm. long, 12 mm. diam. . . . .	.15
2 hand screw clamps, 7" No. 14 . . . . .	.72
2 platform balances, Harvard trip	12.00
2 sets weights, 1,000 to 5 grams	2.50
2 sets weights, 5 g. to 0.01 grams	2.10
1 lb. sulphur roll . . . . .	.10
6 lead sinkers . . . . .	.72
5 waterproof rods, round . . . . .	.25
4 specific gravity bottles, 50 cc.	2.00
4 Boyle's law tubes	3.00
2 Y tubes of lead . . . . .	.40
6 lbs. mercury and bottle	13.50
10 glass tumblers, small . . . . .	.50
12 glass tubes, 50 cm. long, 5 mm. diam. . . . .	.40
6 pinchcocks . . . . .	.90
6 ft. rubber tubing, $\frac{1}{4}$ " diam. . . . .	.60
2 bottles, 2 liter capacity, with one-hole rubber stoppers . . . . .	.60
1 air pump	4.00
1 air pump plate	4.00
{or air pump, \$30.00}	
{or air pump, 20.00}	
2 lb. paraffine . . . . .	.30
1 barometer tube, 80 cm. long . . . . .	.30
1 Nicholson's hydrometer	1.25
1 jar for hydrometer, 12x2 . . . . .	.35
2 cars for inclined plane	2.00
2 pulleys for inclined plane . . . . .	.70

4 iron balls, 25 mm. diam. for pendulum.....	\$.32
1 pr. ivory balls, 1" and 1½".....	6.50

Total for mechanics and properties of matter..... \$116.11

HEAT.

6 flasks, 125 cc. flat bottom.....	\$.90
3 air thermometer tubes, 2" bulb.....	.51
10 thermometers, 10° to 110° c.....	11.00
2 linear expansion apparatus.....	5.00
5 lb. shot.....	.75
8 calorimeters, polished.....	2.80
2 Harvard apparatus "A".....	4.50
1 lb. glass tubing, heavy walled, 1 to 2 mm. internal diam.....	.75
3 iron supports, 2 rings.....	1.20
3 sheets brass wire gauze, 4x4".....	.30
4 oz. paraffine.....	.10
2 nests beakers, No. 1 to 3.....	1.14
4 Florence flasks, 12 oz.....	.84
4 Florence flasks, 16 oz.....	.92
4 Florence flasks, 8 oz.....	.72

Total for heat..... \$31.43

SOUND.

1 Kundt's apparatus.....	\$3.35
1 sonometer.....	5.25
2 resonance tubes.....	3.50
1 tuning fork, C 128, 10" long.....	2.25
2 tuning forks, C 256, 7¼" long.....	2.50
2 tuning forks, A 426, 6¼" long.....	1.70
2 tuning forks, C 512, 5⅞" long.....	1.70

Total for sound..... \$20.25

LIGHT.

10 plain mirrors, 4x15 cm. or 2x6 in.....	\$1.00
1 box to illustrate formation of images.....	1.00
10 double convex lenses, 10 cm. focus.....	2.50
10 double convex lenses, 15 cm. focus.....	1.50
5 lens supports.....	.90
5 screen supports.....	.60
5 pin supports.....	.45
5 Walter Smith school squares.....	.35
1 double convex lens, 15 cm. focus.....	.15
3 concave mirrors, brass.....	1.35
3 triangular glass prisms, 4" long.....	1.05
2 pieces heavy plate glass for refraction.....	.40
4 lbs. paraffine candles, 12's.....	.64

Total for light..... \$11.89

MAGNETISM AND ELECTRICITY.

1 lb. fine iron filings	\$.15
24 knitting needles . . . . .	.20
10 bar magnets, 6"	2.50
4 compasses, 40 mm. diam.	1.20
3 sq. ft. heavy zinc sheets, 1-16" thick	2.70
1 galvanoscope frame	1.15
10 lead strips, 1x10 cm. with wire	1.00
4 sq. ft. sheet copper, No. 24	2.80
10 battery jars, glass, 4x5"	1.60
6 porous cups . . . . .	.60
4 commutators	2.40
10 double connectors, brass	1.20
4 oz. copper wire, No. 30, D. C. C. . . . .	.57
1 lb. copper wire, No. 20, D. C. C. . . . .	.80
4 oz. German silver wire, No. 30, D. C. C.	1.14
4 oz. German silver wire, No. 24, D. C. C. . . . .	.79
9 lbs. sulphuric acid, commercial	1.30
1 Wheatstone's bridge, slide wire form	3.00
1 set resistance spools, set of 8	2.75
6 gravity cells, 6x8	7.20
10 lbs. copper sulphate	2.90
2 resistance boxes, 0.1 to 40 ohms, total resistance 111 ohms	13.00
1 tangent galvanometer	1.65
2 D'Arsonval galvanometers	12.00
10 empty spools for making resistance coils	1.00
Total for magnetism and electricity	\$65.60
Total for entire physics equipment	245.28

DEALERS IN PHYSICAL APPARATUS.

Central Scientific Co., 412 to 420 Orleans St., Chicago, Ill.; W. M. Welch Scientific Co., 1516 Orleans St., Chicago, Ill.; Chicago Apparatus Co., 40-42 West Quincy St., Chicago; Wm. Gaertner & Co., 5347-9 Lake Ave., Chicago; T. W. Gleeson, 106 Sudbury St., Boston; A. W. Hall Scientific Co., 141 Franklin St., Boston; L. E. Knott & Co., 15-17 Harecourt St. Boston; C. H. Stoelting Co., 18 South Green St., Chicago. On request, some of these firms furnish lists of apparatus to fit particular manuals. Many suggestions are also obtained by consulting their general catalogues.

CHEMISTRY.

FOR TWENTY-FOUR STUDENTS WORKING AT A TIME.

Very suggestive details for laboratory equipment are given by Professor E. P. Schoch in Bulletin No. 210, University of Texas, entitled *Chemistry in High Schools*.

PERMANENT EQUIPMENT.

In addition to tables, the following items should be included in fixtures and permanent equipment:

1 draft hood, 4 ft.	\$70.00
15 stock bottles with glass stoppers, one liter.	3.12
40 bottles, glass-stoppered, 250 cc. 8 oz.	4.50
60 bottles, wide-mouthed, flint glass 250 cc., 8 oz.	6.75
6 slop jars, earthenware, 2 gal.	1.50
1 automatic water still.	20.00
1 apparatus case.	18.00
1 Harvard trip scale.	6.00
1 set of weights, 1,000 grams to 5 grams.	2.25
1 set of weights, 1 gr. to 500 grams.	2.20
1 balance.	12.50
1 barometer.	12.00
1 blast lamp, Bunsen's.	3.00
1 bellows, foot, Fletcher's, 7".	4.50
1 Hoffman's electrolysis apparatus.	7.50
1 metric chart.	1.80
1 induction coil.	5.65
2 Mohr's burettes, 50 cc.	2.50
2 Geissler's burettes, with glass stop cocks, 50 cc.	4.00
1 burette clamp, Lincoln's. ....	.90
3 sets cock borers, 3" set.	1.50
1 magnet. ....	.25
2 magnifying glasses. ....	.90
1 ozone tube.	3.25
Total.	\$194.57

If the class work is to include demonstrations by the teacher, a small lecture table and special apparatus should be provided and the sum of \$50 to \$100 added for this.

APPARATUS MORE OR LESS PERMANENT.

30 nests of beakers, 2½, 4 and 7 oz.	\$14.40
30 jeweler's blow pipes, 8".	4.20
72 bottles, wide mouth, 4 oz.	2.10
18 bottles, W. M., 16 oz.	1.20
24 Bunsen burners with air regulator.	6.00
96 corks, ⅝" diam. ....	.56
48 corks, 1 1-16" diam. ....	.40
144 corks, assorted. ....	.50
18 nest of Hessian crucibles, No. 1-2-3.	2.16
48 porcelain crucibles, 1¼" diam.	11.04
24 graduated cylinders, 50cc.	12.00
36 porcelain evaporating dishes, 2¼" diam.	7.20
36 porcelain evaporating dishes, 3½" diam.	14.40
12 lead dishes, 2" diam.	1.20

12 round files, 4"	\$.96
24 three-cornered files, 4"	1.68
24 pkgs. filter paper, 4" diam.	4.80
30 flat-bottomed flasks, 4 oz.	4.50
30 flat-bottomed flasks, 8 oz.	5.40
30 flat-bottomed flasks, 16 oz.	6.90
36 glass funnels, 2½" diam.	6.48
24 steel forceps, 5"	2.88
24 gas bottles, plain, 8 oz.	4.80
50 rubber stoppers, 2-hole to fit gas bottle.	4.00
5 lb. glass tubing, 3-16" and ¼" diam.	2.50
2 lb. glass rods, ⅝" diam.	1.00
1 quire Litmus paper, red and blue assorted. . . . .	.47
1 quire Turmeric paper. . . . .	.48
12 porcelain mortars with pestles 2¾"	3.60
4 ft. platinum wire No. 30 B. & S. gauge.	5.28
30 glass retorts with glass stoppers, 4 oz.	9.00
48 ft. rubber tubing, ¼"	4.80
48 ft. rubber tubing 3-16"	2.88
30 iron sand bath, 5" diam.	3.30
4 hand balances, 6" beam.	7.60
4 sets weights, 50 grams to 1 c. g.	3.00
24 test tube racks, for 10 tubes with drying pins.	7.20
432 test tubes, 6x⅝"	6.75
24 test tube brushes. . . . .	.72
36 watch glasses, 2" diam.	1.05
24 glass plates, blue Cobalt, 3x3"	1.44
48 test tubes, ignition 6"	3.00
6 lamp tips, for blow pipe rest. . . . .	.72
24 filtering stands.	18.00
24 iron wire triangles. . . . .	.76
24 pneumatic troughs with metal cylinder.	12.00
30 retort stands with 3 rings.	16.50
1 pkg. filter paper, 10" diam. . . . .	.80

Total. \$232.61

CHEMICALS.

As the chemicals required will vary somewhat with different textbooks, the list recommended by the text selected should be provided.

No prices are given for chemicals as the present market in chemicals fluctuates greatly and some chemicals are far above normal prices. In the following summary of equipment, therefore, the cost of chemicals is not included.

SUMMARY OF EQUIPMENT.

Permanent equipment (not including tables)	\$194.57
Apparatus more or less permanent.	232.61
Grand total.	\$427.18

MAINTENANCE.

The yearly cost of "apparatus more or less permanent," which must be replaced on account of breakage, will be approximately	\$40.00
The yearly cost of chemicals, approximately	50.00
Total annual expenditure, about	\$90.00

DEALERS IN CHEMICAL APPARATUS.

Apparatus and supplies may be obtained from the following firms:

Central Scientific Co., 412 to 420 Orleans St., Chicago; W. M. Welch Scientific Co., 1516 Orleans St., Chicago; Eimer and Amend, 205-211 Third Ave., New York City; Wm. Gaertner and Co., 5345-5349 Lake Ave., Chicago; E. H. Sargent and Co., 143-145 Lake Street, Chicago; Henry Heil Chemical Co., 212-214 South Fourth Street, St. Louis; Scientific Materials Co., Pittsburg, Pa.; Scientific Co., 345 West Michigan Street, Chicago; Kewaunee Manufacturing Co., Kewaunee, Wis. (laboratory furniture); Leonard Peterson & Co., 1240-1248 Fullerton Ave., Chicago (laboratory furniture); L. E. Knott Apparatus Co., Boston, Mass.; Bausch and Lomb Optical Co., Rochester, N. Y.; Woldenberg and Schaar, 387 Wabash Ave., Chicago; C. H. Stoelting Co., 121 North Green Street, Chicago; Max Kohl, Chemnitz, Germany; Drs. Peters and Rost, Chaussee Strasse, Berlin, Germany.

GENERAL BIOLOGY, BOTANY AND ZOOLOGY.

FOR TEN PUPILS WORKING AT A TIME.

APPARATUS.

2 compound microscopes	\$56.70
10 dissecting scissors, fine	4.50
10 dissecting scalpels	2.50
10 dissecting forceps, fine, straight point	3.60
24 dissecting needles .....	.50
5 section razors	4.25
10 reading glasses, 2½" diam.	6.50
1 balance	3.00
1 set of weights .....	.95
144 glass slides, 3x1	2.00
1 oz. cover glasses, ¾" square	2.00
20 Syracuse watch glasses .....	.92
20 pipettes with rubber bulb .....	.50
2 lb. glass tubing, assorted sizes	1.00
1 each glass dishes, 3 sizes .....	.95
20 Mason's fruit jars, quart size	1.25
24 test tubes, assorted sizes .....	.50
100 bristles .....	.10
1 galvanized waste can, with cover 6½ gal. ....	.90
2 each battery jars, 5x7" and 6x8" .....	.90
Total	\$150.22

REAGENTS AND CHEMICALS.

10 pounds formalin.....	\$2.50
1 gallon alcohol, 95-per cent.....	3.60
1 quart absolute alcohol.....	1.70
1 pound ether.....	.40
1 pound mercury.....	2.25
2 gallons distilled water.....	1.30
1 pound glycerine.....	.50
1 pound turpentine.....	.15
$\frac{1}{2}$ pound cedar oil.....	.75
4 oz. balsam, in xylol.....	.60
1 pound glacial acetic acid.....	.85
1 pound sulphuric acid.....	.30
1 pound hydrochloric acid.....	.25
1 pound nitric acid.....	.35
$\frac{1}{2}$ pound picric acid, crystals.....	2.30
$\frac{1}{2}$ pound corrosive sublimate.....	1.75
1 pound chloroform.....	.75
1 pound caustic potash.....	2.30
$\frac{1}{2}$ pound potassium cyanide, fused lumps.....	.45
1 ounce iodine, resublimed.....	.60
$\frac{1}{2}$ ounce methyl green.....	.50
4 ounces hemalum, solution.....	.60
4 ounces acid carmine, solution.....	.70
$\frac{1}{2}$ ounce eosin, powder.....	.50
1 ounce pith, for sectioning.....	.10

Total..... \$26.05

Grand total..... \$167.27

Aquaria for keeping aquatic forms alive in the laboratory are necessary, and for this purpose large battery jars will be found satisfactory. One dozen tumblers, some wide-mouthed bottles with corks for water or sand cultures, a few thistle tubes, some rubber stoppers, rubber tubing, beeswax or paraffine, and some bibulous paper will be found helpful additions for any work in plant physiology. A few stoneware saucers will also be found indispensable for work on the germination of seeds. Insect cages may be readily made of wire or cotton netting placed over pans or trays filled with earth in which the plants, used as food by the insects, are growing. These, and many other contrivances, for making observations and experiments upon living animals and plants in the laboratory, are of the greatest value, as the chief stress should be laid upon this phase of the instruction.

DEALERS IN ANIMALS FOR CLASS WORK.

Brimley, H. H. & C. S., Raleigh, N. C. (live and preserved material); Marine Biological Laboratory Supply Dept., Woods Hole, Mass. (preserved marine material); McCurdy, B. F. & Co., 312 E. 65th Place, Chicago (live material); Powers, H. H., Station A., Lincoln, Neb. (living hydra, etc., and miscellaneous slides).

Dissection and demonstration material may also be secured from the Zoology Department of the University of Missouri.

DEALERS IN LABORATORY APPARATUS AND SUPPLIES FOR BOTANY
AND ZOOLOGY.

Central Scientific Co., 412 to 420 Orleans St., Chicago; W. M. Welch Scientific Co., 1516 Orleans St., Chicago; Bausch and Lomb Optical Co., Rochester, N. Y. (microscopes and supplies); Cambridge Botanical Supply Co., Cambridge, Mass. (general botanical equipment, preserved material and fresh marine algae); Drury, Miss E. M., 45 Munroe Street, Roxbury, Mass. (slides and botanical material); Eimer & Amend, 205-211 Third Ave., N. Y. (general apparatus, supplies, and reagents); Ernest Leitz, 30 E. 18th St., N. Y. (microscopes and supplies); Marine Biological Laboratory, Supply Department, Woods Hole, Mass. (marine material); Spencer Lens Co., Buffalo, N. Y.

PHYSIOLOGY.

The apparatus and chemicals necessary for the accurate measurement and observation of the activity of such organs as the heart, respiratory system, muscles, nerves, etc., and for the chemical study of the blood, the digestive process, etc., can be had at a comparatively small cost. The lists given below contain some things for which the ingenious teacher may himself make very effective substitutes at little cost.

No prices are given for the first three items in the following list as they are difficult to procure at the present time:

GENERAL APPARATUS FOR DEMONSTRATION.

1 mercury manometer and blood pressure outfit.....	
1 set of test lenses for the eye.....	
1 color wheel, or a small electric motor, with set of color discs...	
1 set physiological charts.....	\$12.00 to \$25.00
2 lb. glass tubing, assorted sizes.....	1.00
5 ft. each rubber tubing, 3-16", $\frac{1}{4}$ " and 5-16".....	1.40
144 corks, assorted.....	.50
Total.....	\$14.90

SPECIAL SETS OF APPARATUS AND CHEMICALS.

2 iron ring stands, 3 rings	\$1.10
2 burette clamps . . . . .	.60
2 Universal burette clamps	1.10
1 triangular file 6" . . . . .	.10
1 pkg. filter paper, 4" diam . . . . .	.20
1 glass funnel, 4" diam . . . . .	.32
1 Bunsen burner . . . . .	.25
1 graduated cylinder, 100 cc . . . . .	.65
1 porcelain evaporating dish, 4" diam . . . . .	.45
1 flat bottom flask, 12 oz . . . . .	.21
1 test tube support . . . . .	.30
12 test tubes, assorted . . . . .	.25
1 nest beakers	1.32
1 chemical thermometer, 110° C	1.10
1 lb. starch . . . . .	.15
1 lb. dextrine . . . . .	.15
1 lb. dextrose . . . . .	.15
4 oz. acetic acid . . . . .	.25
1 lb. nitric acid . . . . .	.35
1 lb. hydrochloric acid . . . . .	.30
1 oz. picric acid . . . . .	.35
2 lbs. ammonia . . . . .	.35
1 lb. caustic soda . . . . .	.20
1 lb. sodium chloride . . . . .	.10
1 lb. magnesium sulphate . . . . .	.15
1 lb. ammonium sulphate . . . . .	.15
1 lb. calcium chloride . . . . .	.20
1 lb. copper sulphate . . . . .	.35
$\frac{1}{2}$ lb. sodium potassium tartrate . . . . .	.40
$\frac{1}{4}$ lb. glycerine . . . . .	.25
1 oz. pepsin . . . . .	.35
$\frac{1}{8}$ oz. ptyolin . . . . .	.25
1 oz. pancreatin . . . . .	.35
$\frac{1}{4}$ lb. fibrin . . . . .	.25
1 set of chemical reagent bottles, 24 to set	3.50
Total	\$16.50
Grand total	\$31.40

DEALERS IN APPARATUS.

Harvard Apparatus Co., Back Bay, P. O., Boston, Mass.;
 Eimer and Amend, New York City, N. Y.; Central Scientific Co.,
 Chicago; W. M. Welch Scientific Co., Chicago.

DEALERS IN CHEMICALS.

Mallinckrodt Chemical Co., St. Louis, Mo.; Merck & Co., St.
 Louis, Mo.

CHARTS.

Goder-Heiman, 623 South Wabash Ave., Chicago; A. J. Nyström, 623 South Wabash Ave., Chicago.

PHYSICAL GEOGRAPHY.

GENERAL EQUIPMENT.

1 collection of rocks and minerals	\$2.50
1 universal sun dial	4.50
1 set Six's self-registering thermometers	3.75
1 sight compass	8.00
1 rain gauge	2.50
1 Mason's hygrometer	4.50
1 terrestrial globe, 12" diam	4.50
100 lbs. modeling clay	2.75
1 set physical wall maps, N. A., S. A., Asia, Africa, Europe, U. S., in spring roller case	23.40
Daily and monthly weather maps. (The daily maps may be obtained from the nearest weather bureau station, the monthly from the Weather Bureau at Washington, D. C.).	
Total	\$56.40

TOPOGRAPHIC MAPS.

Order maps direct from the United States Geological Survey, Washington, D. C.

An act of Congress approved February 18, 1897, authorizes the Director of the Geological Survey to sell these maps at such prices as may from time to time be fixed. The price of the standard maps, covering either large or small quadrangles, is 10 cents each, but a discount of 40 per cent is allowed on an order amounting to \$5 at the retail price—that is, the wholesale rate for standard topographic maps is \$3 for 50. The discount is allowed on an order for maps alone, either in one kind or in any assortment, or for maps together with geologic folios. No discount will be allowed on an order amounting to less than \$3. Prepayment is required and may be made by money order, payable to the Director of the United States Geological Survey (not postage stamps), or in cash—the exact amount—at sender's risk.

If maps ordered are not in stock the right is reserved to substitute others rather than return very small sums of money by mail, unless directions to the contrary are given in the order. *Name of county should be included in post-office address.*

The Survey cannot supply mounted maps.

All correspondence should be addressed to

The Director,

United States Geological Survey,

Washington, D. C.

The number of copies of each map needed will depend upon the number of pupils in the class and the plan of work. There should be one map for each two students. The maps should conform to the requirements of the notebook used.

Simple plain or plateau: Thibodeaux, Louisiana; Fargo, North Dakota; Bowling Green, Ohio; Coude, South Dakota; Chicago, Illinois.

Simple mountain ridge: Harrisburg, Pennsylvania; Delaware Water Gap, New Jersey-Pennsylvania.

Plain with young valleys: Wilson, New York; Fostoria, Ohio; Dublin, Ohio.

Mountains with shallow valleys: Shasta, California; Harper's Ferry, Virginia-Maryland.

Plains with well-defined valleys: Palmyra, Missouri; Wicomico, Maryland; Olivet, South Dakota.

Dissected mountains: Mt. Marcey, New York; White Mts., New Hampshire.

Dissected plains: Lancaster, Wisconsin; Versailles, Missouri; Hazard, Kentucky; Ironton, Ohio-Kentucky.

Past mature plains: Clinton, Missouri; Nevada, Missouri; O'Fallon, Missouri.

Plains with hills and valleys: Warrenton, Virginia; Frederick, Maryland.

Plains with hills: Eagle, Wisconsin; Oswego, New York; Baldinsville, New York.

Plains with mountain ridges and valleys: Harrisburg, Pennsylvania.

Maps of valleys: Map of alluvial valley of the Mississippi River; Kansas City, Missouri; Wheeling, West Virginia-Ohio; Niagara Falls, New York; Harpers Ferry, Virginia-Maryland; Albany, New York; Charleston, West Virginia; Hinton, West Virginia; Sullivan, Missouri; Marseilles, Illinois; St. Louis, Missouri-Illinois, (12c). Map of the United States showing the Mississippi, Potomac, Delaware and other river basins.

Ponded rivers: Norwich, Connecticut; Perch Lake, Michigan.

Drowned valleys: New London, Connecticut; Saybrook, Connecticut; Washington, D. C.; New York City, New York, (30c).

River deposits (flood plains): Marshall, Missouri; St. Louis, Missouri-Illinois; Kansas City, Missouri; Thibodeaux, Louisiana; Gibson, Louisiana; The Alluvial Valley of the Mississippi River.

Maps of recently drained lake bottoms or recently uplifted sea bottoms: Fargo, North Dakota-Minnesota; Chicago, Illinois; Fostoria, Ohio; Camden, New Jersey; Edenton, North Carolina; Trent River, North Carolina.

Wind deposits: Kingsley, Kansas; Brown's Creek, Nebraska; Campe Clark, Nebraska; Provincetown, Massachusetts.

Glacial deposits: Moraines: Eagle, Wisconsin; Charleston, Rhode Island; Brooklyn, New York; Plainfield, New Jersey. Drumlins: Oswego, New York; Baldwinsville, New York; Boston, Massachusetts; Sun Prairie, Wisconsin. Sand and gravel plains:

Jonesville, Wisconsin; Plainfield, New Jersey; Great Egg Harbor, New Jersey; Lynn, Massachusetts; Boston Bay, Massachusetts; Sandy Hook, New Jersey.

The following maps illustrate some of the erosive effects of glaciers, waves of seas and lakes:

U-shaped valleys: Leadville, Colorado (the high valleys); Watkins, New York; Hammondsport, New York.

Fjords: Methow, Washington; Stehekin, Washington; Juneau, Alaska.

Lakes: Webster, Massachusetts; Franklin, New Jersey; Paradox Lake, New Jersey; Plymouth, Massachusetts; Minneapolis, Minnesota.

Shore cliffs: Sandy Hook, New Jersey; San Francisco, California; Boston and vicinity, Massachusetts, (12c).

Volcanic deposits: Volcanic Cones: Mt. Shasta, California; Lassen Peak, California; Mt. Tabor, New Mexico.

Lava plains and plateaus: Modoc Lava Beds, California: Bisuka, Idaho.

Laccolite mountains: San Rafael, Utah; Henry Mountains, Utah.

Good illustrative maps: Dunlap, Illinois; Kanawha Falls, West Virginia; Hinton, West Virginia; Ocean, West Virginia; Chattanooga, Tennessee; McMinnville, Tennessee; Cleveland, Tennessee; Suwanee, Tennessee; Ringgold, Tennessee; Belchertown, Massachusetts; Northampton, Massachusetts; Springfield, Massachusetts; Charleston, West Virginia; Nichols, West Virginia; Echo Cliffs, Arizona; Tooele Valley, Utah; Kaaterskill, New York; Mt. Marcy, New York; Catskill, New York; Disaster, Nevada; Granite Range, Nevada; Harrisburg, Pennsylvania; Pine Grove, Pennsylvania.

CHARTS.

The following charts may be secured from the United State Coast and Geodetic Survey, Washington, D. C.:

Atlantic Ocean.

Sailing charts, A, B, C, D, each.....	\$.50
General charts of the coast, Nos. 6, 7, 376, 11, 19, 21, each.....	.50
Coast charts, Nos. 105, 106, 120, 121, each.....	.50

Pacific Ocean.

Sailing charts, S.....	.50
General charts of the coast, Nos. 550, 6,000, 8,100, 8,200) each.....	.50
Harbor chart, No. 5581.....	.50
One set tide tables, Atlantic Coast; U. S. Coast and Geodetic Survey.....	.25
One set tide tables, Pacific Coast; U. S. Coast and Geodetic Survey.....	.25

Weather maps, Order from U. S. Weather Bureau, St. Louis, Missouri.

ADDITIONAL APPARATUS.

1 slated globe, 8" with movable meridian.....	\$3.50
1 series of lantern slides to illustrate the phenomena of Physical Geography. Selected and prepared by Wallace W. Atwood of the University of Chicago and Jane Perry Cook of the Chicago Normal, with descriptive text for each slide. (Circular sent upon application.) Complete set, 550 slides each.....	.40
1 college bench lantern with objective, condensing lens and slide carrier. (Illuminant extra depending upon the kind wanted).....	35.00
1 heliodon invented by Prof. J. F Morse of the Medill High School, Chicago, an adjustable appliance for demonstrating the apparent path of the sun through the sky at equinox and solstice times with reference to the horizon and zenith of an observer at any latitude. (Circular sent upon application.) Net..	10.00
1 soil thermometer.....	1.35
1 baragraph.....	40.00
1 thermograph.....	40.00
Total.....	\$130.25

AGRICULTURE.

24 student's lamp chimneys.....	\$2.00
24 bottles, wide mouth, 1 oz.....	.46
24 bottles, wide mouth, 6 oz.....	.90
4 thistle tubes.....	.40
1 lb. glass tubing, $\frac{1}{4}$ ".....	.50
4 thermometers.....	4.40
72 test tubes, 8x1".....	2.40
1 trip scale.....	6.00
1 set weights, 500 grams to 1 gram.....	2.20
1 Babcock milk and cream tester, 4 bottle size.....	5.50
8 shallow pans, 1 qt.....	1.44
4 glass funnels, 3".....	.80
2 sieves, wooden frames, 20 mesh.....	.70
2 sieves, wooden frames, 60 mesh.....	.80
1 sieve, wooden frame, 100 mesh.....	.57
1 lb. glass rods, small.....	.50
1 lb. glass tubing, small diameter.....	.50
8 tripod microscopes.....	4.80
1 soil auger.....	2.25
2 percolation cylinders, brass.....	3.00
2 evaporation cylinders, brass.....	4.50
2 graduated cylinders, 100 cc.....	1.30
3 blast lamps, gasoline.....	9.75
Total.....	\$55.77

MATERIAL TO BE PURCHASED AT HOME.

- 4 Mason's pint fruit jars.
- 3 doz. 6" flowerpots with saucers.
- 4 doz. 4" flowerpots with saucers.
- 16 heavy dinner plates.
- 16 panes of glass, 8x11.
- 1 tiling spade.
- 1 table, 3½ ft x 12 ft.
- 1 suitable case for storing apparatus.

At least an acre of ground should be provided. This can be purchased or leased.

APPARATUS NOT REQUIRED, BUT VERY DESIRABLE.

2 soil thermometers	\$2.50
1 dissecting microscope	9.50
1 bucket sprayer	5.00

This apparatus may be purchased of the W. M. Welch Scientific Co., Chicago; the Central Scientific Co., Chicago, or any other standard scientific apparatus company. There will be a discount of about ten per cent from the prices listed.

The Missouri College of Agriculture at Columbia will furnish at cost collections of economic seeds, plants and weeds, plant diseases, injurious insects and typical Missouri soils. Much valuable illustrative material may be secured free from large firms engaged in the manufacture of cereal products, fertilizers, etc.

GENERAL SCIENCE.

1 balance, horn pan	\$1.90
1 set weights, 50 g. to 1 mg	2.00
1 set beakers, 150 cc to 1,000 cc	1.70
4 wide-mouth bottles, 2, 8, 16 and 32 oz. (1 each) . . . . .	.24
2 blast lamps provided the laboratory is not supplied with gas	6.50
1 burette clamp for iron stand . . . . .	.30
1 Hoffman clamp, medium . . . . .	.15
1 rat tail file, 5" . . . . .	.09
1 triangular file, 5" . . . . .	.09
3 Florence flasks, 100, 250, 500 cc. (1 each) . . . . .	.56
1 round bottom flask, 1,000 cc . . . . .	.35
1 iron forcep, 4" . . . . .	.10
3 funnels, 2, 4 and 8" (1 each)	1.09
4 glass plates, 2" square . . . . .	.12
2 lbs. glass tubing, 7 mm. outside diam	1.00
1 meas. cylinder, 50 cc . . . . .	.50
1 meas. cylinder, 250 cc . . . . .	.90
8 one-hole rubber stoppers . . . . .	.50
8 two-hole rubber stoppers . . . . .	.50
1 ring stand, 3 rings . . . . .	.55

6 test tubes, $\frac{3}{4}$ x6"	\$.14
2 thermometers, centigrade 110° C	2 .20
2 thermometers, Fahrenheit 220° F	2 .20
4 thistle tubes, straight stem	.40
1 wing top (burner attachment)	.08
6 squares iron wire gauze, 10 cm. sq	.24
1 exhaust and compression pump	4 .00
6 tin pans, 7" diam	.30
4 lamp chimneys	.34
2 sq. ft. dental rubber	.60
6 candles	.30
6 drinking tumblers	.30
1 spool copper wire No. 18	.25
1 spool linen thread	.10
1 hard glass test tube 1x8	.12
1 funnel separatory bell shape with glass stop cock, 2. oz.	1 .10
1 barometer tube	.30
6 magnifiers	1 .92
100 13" filter papers	1 .10
1 meter and yardstick	.25
1 lb. marble chips	.10
2 lbs. mercury	4 .50
2 glass prisms	.60
1 set of lenses	1 .25
1 reading glass, 2"	.50
1 horseshoe magnet	.12
2 bar magnets	.50
1 electrolysis apparatus	3 .25
1 dry cell battery	.35
1 electric bell	.40
2 pinch cocks	.16
1 pinch cock screw compression	.20
2 battery jars, 6x8	.50
1 brass globe for weighing air	2 .25

Total **\$50.07**

This apparatus may be secured from the W. M. Welch Scientific Co., Chicago, or the Central Scientific Co., Chicago.

CHEMICALS (Less than \$10.00.)

Acid, hydrochloric	Iron filings
Acid, sulphuric	Lime Water
Alcohol	Litmus paper
Ammonium hydroxide	Paraffin
Carbon disulphide	Phosphorus
Charcoal, lumps	Potassium chlorate
Copper sulphate	Potassium permanganate
Ether	Starch
Gasoline	Sugar, Cane and Grape
Hydrogen peroxide	Zinc and zinc sheet

In addition, some equipment should be purchased for individual experiments by the class. The cost of the individual equipment will probably vary from six to twelve dollars per student, depending upon the method of instruction used.

MANUAL TRAINING.

The following suggested equipment for woodworking and mechanical drawing is taken from The University of Missouri Bulletins volume 17, number 3, entitled Technical Manual Arts for General Educational Purposes by Ira S. Griffith, Chairman the Manual Arts Department.

WOODWORKING.

MINIMUM BENCH EQUIPMENT.

Bench, open frame without drawer, glued-up top 23" by 52", tool rack, rapid acting vise, approximate cost....	\$10.00
Jack-plane, 14", each.....	1.85
Wooden mallet, round, hickory, 5"x3".....	.13
Rule, 2-foot.....	.17
Hammer, bellfaced claw, 13 oz.....	.50
Chisels, socket firmer, $\frac{3}{8}$ " and $\frac{1}{4}$ ", both.....	.85
Marking gage.....	.12
Trysquare, 7 $\frac{1}{2}$ ".....	.24
Backsaw, 12".....	1.10
Swedish sloyd knife No. 7.....	.40
Bench brush.....	.30
Benchhook.....	.25
Chiselboard.....	.00
Total list price.....	\$15.91

MINIMUM INDIVIDUAL EQUIPMENT.

1 jackplane single iron.....	\$.25
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MINIMUM GENERAL EQUIPMENT FOR TWENTY PUPILS.

6 wing dividers, 6", each 23c.....	\$1.38
6 pencil compasses, each 15c.....	.90
6 nail sets, cup pointed, assorted size, each 10c.....	.60
6 try-squares, 12", each 36c.....	2.16
3 turningsaws and frames, 18", each \$1.00.....	3.00
6 spokeshaves, Bradshaw and Field or Stanley No. 84, 2 $\frac{1}{2}$ ", nut adjusted, each 59c.....	3.54
3 gouges, 1", No. 8, outside bevel, each 43c.....	1.29
2 ratchet braces, 8" sweep, each \$1.45.....	2.90
2 plain braces, 8" sweep, each \$1.08.....	2.16
3 crosscut saws, 22", 10 pt., each \$1.55.....	4.65
3 rip-saws, 24", 8 pt., each \$1.65.....	4.95
2 planes, jointer, 22", each \$3.03.....	6.06
2 rosehead countersinks, each 23c.....	.46

2 screwdriver bits, each 17c.....	\$.34
4 screwdrivers, 4" blade, fluted handle, each 25c.....	1.00
2 auger bits, 1 $\frac{1}{4}$ ", each 80c.....	1.60
4 auger bits, 1", each 60c.....	2.40
2 auger bits, $\frac{3}{4}$ ", each 50c.....	1.00
4 auger bits, $\frac{1}{2}$ ", each 35c.....	1.40
4 dowel bits, $\frac{3}{8}$ ", each 27c.....	1.08
4 dowel bits, $\frac{1}{4}$ ", each 27c.....	1.08
4 dowel bits, 3-16", each 12c.....	.48
1 T-bevel, 8".....	.44
1 monkeywrench, 8".....	.50
1 pair combination pliers, 6".....	.40
2 combination India oilstones, 6"x2"x1", in iron boxes, each \$1.00.....	2.00
1 oil can, $\frac{1}{4}$ pt, each 18c.....	.18
6 hand screws, No. 812, each 40c.....	2.40
2 steel bar carpenter clamps, 2 $\frac{1}{2}$ ft., each \$1.69.....	3.38
1 set steel figures, 3-16", each \$1.88.....	1.88
1 shellac can, 1 qt.....	.25
1 kerosene glue heater, 2 pts.....	1.50
1 steel framing square.....	1.00
6 copingsaws with blades, each 25c.....	1.50
2 brad awls, each 15c.....	.30
2 scribe awls, each 15c.....	.30
1 Pyko peerless dry emery grinder.....	6.00
1 Stanley combination plane.....	6.00
Total list price for general equipment.....	\$72.46

LIBERAL BENCH EQUIPMENT.

Where money is available for individual edged tools, the benches best suited are of the cabinet type having drawers below in which each student may keep his individual edged tools. Such bench with drawers enough to accommodate all the boys that will be able to make use of the bench during the day, with a hinged or revolving board upon which may be fastened the general tools that belong to that bench, will cost approximately \$16.50. This includes a first class rapid acting vise. The following tools should be added to those specified for the minimum bench equipment:

Smoothplane, 1 $\frac{3}{4}$ " cutter, 8" long.....	\$1.66
Jointerplane, 2 $\frac{3}{8}$ " cutter, 22" long.....	3.03
Screwdriver, 6".....	.35
T-bevel, 6".....	.40
Combination India oilstone, 1"x2"x6".....	1.00
Oil can.....	.18
Crosseut saw, 20", 10 pt.....	1.40
Ripsaw, 22", 8 pt.....	1.55
Spokeshave, 2 $\frac{1}{2}$ " blade, Bradshaw and Field or Stanley No. 84.....	.57
Total list price.....	\$10.14

LIBERAL INDIVIDUAL EQUIPMENT.

Provide for each drawer, that is, provide each boy with the following:

Chisel, 1", bevel edged, firmer socket.....	\$.57
Chisel, $\frac{1}{4}$ ", bevel edged, firmer socket.....	.41
Chisel, $\frac{3}{8}$ ", socket mortise.....	.40
Plane iron for jointer.....	.29
Plane iron for jackplane.....	.25
Plane iron for smoothplane.....	.23
Spokeshave iron.....	.15
Sloyd knife, 2 $\frac{3}{8}$ ".....	.40

Total list price..... \$2.70

This list presupposes that the mortising of the first year will be done by chisel alone; no boring. If mortises are to be bored first, it will be advisable to equip each bench with an 8" ball-bearing brace, cost, \$1.45.

LIBERAL GENERAL EQUIPMENT FOR TWENTY PUPILS.

In addition to the general tools specified for the minimum equipment, make the following changes and additions:

Omit emery grinder, rip and crosscut saws, the plain braces in case the bench is so equipped, handscraws and clamps, and glue heater. Add these:

1 doz. handscraws, cost each 40c.....	\$4.80
2 doz. carpenters' clamps, wood bar, 2-ft., each 85c.....	20.40
1 doz. carpenters' clamps, wood bar, 4-ft., each 95c.....	11.40
1 set steel letters, 3-16", each \$1.88.....	1.88
1 steam or electric glue heater, each \$9.50.....	9.50
2 drawknives, 8", each 65c.....	1.30
$\frac{1}{2}$ doz. steel cabinet scrapers, each 10c.....	.60
1 set auger bits in box, each \$4.00.....	4.00
Electric grinder and motor.....	50.00
1 bandsaw and motor.....	150.00

Total list price..... \$253.88

Lockers for unfinished work will cost about \$4 per pupil and glue and varnish tables \$4.50 per running foot, according to the Montclair, N. J., system, which is highly recommended for convenience and completeness.

About 10 per cent should be added to the cost of equipment for breakage and supplies unthought of.

MECHANICAL DRAWING.

FOR A CLASS OF TWENTY PUPILS WORKING AT THE SAME TIME.

20 drawing tables, top 40x26, cabinet style	\$240.00
20 sets of drawing instruments	70.00
20 T-squares (cherry)	8.00
20 triangles, 45, 7"	8.00
20 triangles, 30, 60, 7"	7.00
20 white pine drawing boards, 20"x25"	18.00
20 architects' triangular scales	8.50
20 irregular curves	9.60

Total list price	\$369.10
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Each pupil should possess the following:

1 dozen thumb tacks05
1 pencil and ink eraser05
1 sponge eraser . . . . .	.10
1 sketchbook, for pencil . . . . .	.10
1 pencil, soft, finest grade, No. 2 . . . . .	.10
1 pencil, 4H, for mechanical drawing . . . . .	.05
1 bottle Higgins' black drawing ink . . . . .	.25

Drawing paper in large sheets, size 19x24, of good quality, for mechanical drawing, may be had from 2c to 5c per sheet.

(In many communities pupils are required to purchase instruments.)

DEALERS IN TOOLS AND MANUAL TRAINING SUPPLIES.

Schroeter Bros. Hardware Co., 717-719 Washington Ave., St. Louis, Mo.; Simmons Hardware Co., St. Louis, Mo.; Orr & Lockett Hardware Co., 71-73 Randolph St., Chicago, Ill.; E. H. Sheldon & Co., 320 North May St., Chicago, Ill.; Hammacher, Schlemmer & Co., 4th Ave. and 13th St., New York City; The Chas. A. Strelinger Co., 96 Bates St., Detroit, Mich.

DEALERS IN DRAWING MATERIAL.

The following firms are among those which are reliable: Eugene Dietzgen Co., Chicago; F. Weber & Co., St. Louis; A. S. Aloe Co., St. Louis; Keuffel & Esser Co., St. Louis.

HOUSEHOLD ARTS.

FOR SIXTEEN STUDENTS WORKING AT A TIME.

COOKING.

The following list of equipment is intended to be suggestive. The prices quoted are only approximate. In the case of such things as desks, refrigerator, supply cabinet and cupboards, cheaper equipment may be secured, if necessary. Detailed information with regard to equipment may be found in *Equipment for Teaching Domestic Science* by Helen Kinne. Whitecomb & Barrows Huntington Chambers, Boston, Mass. The price of this book is eighty cents.

Gas range	\$21.00
Gasoline stove, with oven (if there is no gas)	10.00
16 individual stoves, each .75	12.00
8 desks, each 5 ft. long, each	25.00
16 stools, each .50	8.00
1 sink	4.00
Refrigerator	25.00
Supply cabinet	10.00
Grocery cupboard	5.00
China cupboard	10.00
1 set scales	3.00
1 microscope	20.00
8 dishpans, each .25	2.00
8 tin boxes for flour, each .08 . . . . .	.64
8 tin boxes for sugar, each .08 . . . . .	.64
8 plates for soap and sapolio, each .05 . . . . .	.40
100 test tubes	1.00
Litmus paper	
Box of corks	
Box of matches . . . . .	.03
8 thermometers, each .30	2.40
4 shallow biscuit pans made to fit the oven . . . . .	.40
8 biscuit cutters, each .05 . . . . .	.40
Roasting pan . . . . .	.25
2 deep iron kettles . . . . .	.75
2 wire baskets, each .10 . . . . .	.20
2 draining spoons . . . . .	.06
2 large stew kettles, each .50	1.00
Large grater . . . . .	.05
2 large double boilers, each .25 . . . . .	.50
4 ice cream freezers, 1 qt.	5.00
2 doz. fruit jars	1.50
2 doz. jelly glasses	2.00
8 muffin rings	2.00
Meat grinder	1.25
Coffee pot (percolator)	3.50
Flour sifter . . . . .	.10
Tea kettle . . . . .	.75
6 small tin buckets . . . . .	.30
Large sauce pan . . . . .	.25
Carving knife . . . . .	.25
Tea pot . . . . .	.25
2 scrubbing brushes, each .15 . . . . .	.30
40 dish cloths, linen, $\frac{1}{4}$ yard in length	2.00
50 dish towels, linen, 1 yard in length	7.50
16 sets of apparatus, as follows:	
tablespoon . . . . .	.06 2-3
2 teaspoons, each .03 1-3 . . . . .	.06 2-3
salt spoon . . . . .	.05
wooden spoon . . . . .	.05

fork	\$.07
spatula . . . . .	.25
paring knife . . . . .	.05
measuring cup . . . . .	.08
mixing bowl . . . . .	.50
large baking dish . . . . .	.35
ramekin . . . . .	.10
plate (porcelain) . . . . .	.10
pie tin . . . . .	.03
clover egg beater . . . . .	.10
egg whip . . . . .	.02
rolling pin . . . . .	.30
molding board . . . . .	.10
deep cake and bread pan . . . . .	.10
2 sauce pans, each .25 . . . . .	.50
cover for sauce pans . . . . .	.05
frying pan . . . . .	.08
wire strainer . . . . .	.10
double boiler . . . . .	.25

SEWING.

This list, as the preceding one, is intended to be suggestive. The prices quoted are only approximate. In the case of tables, cabinets and teacher's desk, cheaper equipment may be secured.

4 tables, each 10 ft. in length, each \$16.00	\$64.00
16 chairs, each .75	12.00
2 cabinets, each \$10.00	20.00
1 teacher's desk	15.00
1 mirror	6.00
4 sewing machines, each \$25.00	100.00
16 sets as follows:	
12-inch ruler . . . . .	.05
yard ruler, metal edge . . . . .	.20
pair scissors . . . . .	.75
tape measure . . . . .	.05
pin cushion . . . . .	.10
emery . . . . .	.05
work box . . . . .	.10

SUGGESTIONS FOR EQUIPPING AND CARING FOR LIBRARIES.

GENERAL INFORMATION

1. Following the name of each book two prices are given. The first is the publishers list price. The second is the special district price which the **Missouri Store Co., Columbia Mo.** makes to boards of education *when books are purchased for library purposes.* The district price is f. o. b. Columbia, Mo., and for mail or express shipments the terms are the same as listed; but on all orders amounting to twenty-five (\$25.00) dollars or more, the Missouri Store Co. will prepay freight charges to the school's nearest freight station. As a rule, nothing is gained by asking for bids on orders of books. For list of publishers see page 166.

2. In writing for books one should be careful to *state exactly what is wanted*, giving author, title, edition, publisher. This will avoid mistakes, confusion and delay in shipment. To save space, the abbreviation E. L. in parenthesis thus (E. L.), following a title is used to designate Everyman's Library edition. This edition of the classics is also published in a special "reinforced library binding," list price 50 cents, which the Missouri Store Co. will furnish at 38 cents per volume, but unless otherwise specified orders are filled in the regular trade edition at 32 cents per volume.

3. The order for all books to be purchased during the year should be placed before the opening of school so the pupils may have the use of them during the entire term.

4. Third class high schools should have at least the double starred (**) books for every subject taught. Second class high schools should have the double starred books and at least half of the single starred (*) books or their equivalent in every subject taught. First class high schools should have for a minimum all the double starred and single starred books or the equivalent of same in every subject taught. In books marked by a cross (x) the department recommends that duplicate copies be secured, at least one copy for every four students.

5. Cheap but serviceable editions of the standard works of literature are specified so that districts with small appropriations may purchase a maximum amount of usable material. Districts with ample funds may find it advisable to purchase higher priced editions. There are so many good cheap editions of the classics suggested for study and practice (see pages 36-39) that no particular edition is recommended for this purpose. Many of the school book companies publish excellent editions of these.

6. Every high school teacher should have access to a few good books, treating methods of presenting special subjects. A suggested list is given on page 162.

7. When the books are received they should be compared with the order and bill. Each book should then be carefully opened by placing the back on a flat surface and smoothing down a few leaves at the front and back alternately, pressing upon the inner margin, until the middle of the book is reached. Opening a new book in this way tends to make it stay open at any page desired and prevents splitting or breaking the binding.

8. A permanent record of each new book should be made. This record should include the author, title, publisher, date, cost and from whom purchased. Each volume should be numbered and stamped indelibly with the name of the school (see under library records, page 32).

9. The library should be as convenient as possible to the students during study hours, and books should be loaned for home study and reading. Books loaned should be charged to the borrower until they are returned. The library is of service only to the extent to which it is used. If the library is large enough to warrant the employment of a regular librarian, some one with special library training should be secured. Every library of over 1000 volumes should be catalogued on cards.

10. The following lists of books are neither perfect nor exhaustive. They are intended as a guide for schools that do not already have a good working library. For additional reference books in the various subjects see Bulletin No. 545, issued free by the U. S. Bureau of Education. For additional books of general interest for home reading see the Report of the Committee upon Home Reading (issued

by the National Council of Teachers of English, 68th Street and Steward Avenue, Chicago).

11. On page 163 will be found lists of bulletins for free distribution in various subjects from different sources. Many of these bulletins contain valuable information which it is difficult to receive from any other sources. Every good high school library should have a collection of well selected bulletins. These bulletins should be classified and listed so that they can be referred to easily. The fact that these bulletins are distributed free of cost should not be an inducement to handle them carelessly. It has taken public money to have these bulletins published and they should receive as careful attention as other library books. While this department urges the securing of well selected collections of bulletins, it wishes to discourage the practice of indiscriminate ordering of bulletins regardless of the nature of the bulletins, whether they will be of value to the school or not. Only such bulletins should be secured as will be of actual help in some course.

BOOKS FOR HIGH SCHOOL LIBRARIES.

See pages 115, 116, 117.

The double starred (**) books in every subject taught constitute the minimum library equipment for a third class high school.

The double starred books and at least one half of the single starred (*) books or their equivalent in every subject taught constitute the minimum library equipment for a second class high school.

The double starred and single starred books or their equivalent in every subject taught is the minimum library equipment for a first class library.

Duplicate copies or their equivalent should be secured in books marked with a cross (x).

GENERAL REFERENCE.

	List Price	Dist. Price
** <i>Abstract of Census</i> (write congressman)	Free	
** <i>Webster's New International Dictionary</i> , Merriam	\$12.00	\$10.80
* <i>Bartlett, Familiar Quotations</i> , new edition, Little . .	3.00	2.26
* <i>Brewer, Reader's Handbook</i> , Lippincott	2.00	1.52
* <i>Classical Dictionary</i> , Harper	6.00	5.15
* <i>Lippincott's New Gazetteer</i> , Philadelphia	10.00	8.70
* <i>Lippincott's Biographical Dictionary</i> , Philadelphia	10.00	8.70
* <i>New International Encyclopaedia</i> (24 vols.), second edition, Dodd, Mead	92.50	90.75
* <i>Rand McNally's Indexed Atlas of the World</i> (2 vols.)	25.00	23.35
* <i>World Almanac</i> , New York World (Paper), Annual . . . . .	.30	.30
<i>Brewer, Dictionary of Phrase and Fable</i> , Lippincott	1.50	1.15
<i>Roberts', Rules of Order</i> , Scott, Foresman . . . . .	.75	.49
<i>Roget, Thesaurus of English Words and Phrases</i> , new edition, Crowell	1.50	.99
<i>Stephen and Lee's Dictionary of National Biographies</i> (22 vols.), Macmillan	93.50	80.00
<i>World Almanac</i> , New York World, (cloth) Annual	-.60	.52

ENGLISH.

FOR REFERENCE, STUDY AND GENERAL READING.

	List Price	Dist. Price
**Greenough and Kittredge, <i>Words and their Ways in English Speech</i> , Macmillan	\$ 1.10	\$.96
**Lounsberry, <i>History of English Language</i> , Holt	1.25	1.09
**Whitney, <i>Essentials of English Grammar</i> , Ginn . . . . .	.75	.66
x(**)Wooley, <i>Handbook of English Composition</i> . . . . .	.75	.66
**Fulton and Trueblood, <i>British and American Eloquence</i> , Ginn	1.25	1.09
x(**)Gayley, <i>Classic Myths in English Literature</i> , Ginn	1.50	1.30
x(**)Manley, <i>English Poetry</i> , Ginn	1.50	1.32
x(**)Manley, <i>English Prose</i> , Ginn	1.50	1.32
x(**)Page, <i>Chief American Poets</i> , Houghton	1.75	1.52
x(**)Pancoast, <i>Introduction to American Literature</i> , Holt	1.12	1.00
x(**)Pancoast, <i>First Book in English Literature</i> , Holt	1.25	1.10
**Pancoast, <i>Standard English Poems</i> , Holt	1.50	1.20
**Pancoast, <i>Standard English Prose</i> , Holt	1.50	1.30
**Bible, No. 6653 (Authorized version), "International" (Cloth) Winston	1.50	.98
**Bible, <i>Biblical Idyls</i> , Ed. Moulton, Macmillan . . . . .	.50	.43
x(**)Burke, <i>American Speeches and Letters</i> , (E. L.), Dutton . . . . .	.40	.32
**Carlyle, <i>Essays on Burns</i> , Scott and Johnson (Temple Classics) . . . . .	.45	.39
**Childs (Tr.) <i>Beowulf</i> , (Riv. Ser.), (on linen) Houghton . . . . .	.25	.23
**Cooper, <i>The Deerslayer</i> , (Pocket Classics), Macmillan . . . . .	.25	.23
**Cooper, <i>The Pilot</i> , Abridged, (Eclectic Classics), Am. Bk. Co. . . . .	.40	.36
**Cooper, <i>The Spy</i> , (Pocket Classics), Macmillan . . . . .	.25	.23
**Emerson, <i>Essays</i> , (Riv. Lit. Ser.), Houghton . . . . .	.40	.32
**Everyman and Other Miracle Plays, (E. L.), Dutton . . . . .	.40	.32
**Franklin, <i>Autobiography</i> , (E. L.), Dutton . . . . .	.40	.32
**Goldsmith, <i>Poems and Plays</i> , (E. L.), Dutton . . . . .	.40	.32
**Gregory, <i>Seven Short Plays</i> , Luce	1.75	1.40
**Hawthorne, <i>Twice Told Tales</i> , (Riv. Lit. Ser.), Houghton . . . . .	.60	.48
**Heydrick, <i>Types of the Short Story</i> , Foresman . . . . .	.35	.32
**Irving, <i>Sketch Book</i> (E. L.), Dutton . . . . .	.40	.32
x(**) Lamb, <i>Tales of Shakespeare</i> , (E. L.), Dutton . . . . .	.40	.02
**Lincoln, <i>Speeches and Letters</i> , (E. L.), Dutton . . . . .	.40	.32
**Longfellow, <i>Poems</i> , 1823, 1866, (E. L.), Dutton . . . . .	.40	.32

	List Price.	Dist. Price.
**Lowell, <i>Poems</i> , (Household Ed.), Houghton....	\$1.50	\$1.13
**Palgrave, <i>Golden Treasury of English Verse</i> , (E. L.), Dutton.....	.40	.32
**Poe, <i>Complete Poetical Works</i> , Burt.....	1.00	.44
**Scott, <i>Complete Poetical Works</i> , Ed. by Norton (Astor Ed.), Crowell.....	.60	.40
**Scott, <i>Ivanhoe</i> , (E. L.), Dutton.....	.40	.32
**Shakespeare, <i>Plays</i> , each, (cloth cover).....	.25	.23
Hamlet		
Henry V.		
Henry VIII.		
Julius Caesar.		
Macbeth.		
Merchant of Venice.		
Twelfth Night.		
Comedy of Errors.		
**Stevenson, <i>Treasure Island</i> , (E. L.), Dutton....	.40	.32
**Stevenson, <i>An Inland Voyage, and Travels with a Donkey</i> , (E. L.), Dutton.....	.40	.32
**Tennyson, <i>Poems and Dramatic Works</i> , (Cam- bridge Edition), Houghton.....	2.00	1.50
**Washington, <i>Farewell Address</i> , etc., Houghton..	.25	.23
x(**)Webster, <i>Best Speeches</i> , Little.....	.35	.32
50 Volumes (**) Books—Total cost (one copy of each).....		\$29.27
*Genung, <i>Working Principles of Rhetoric</i> , Ginn..	1.40	1.22
*Krapps, <i>Modern English</i> , Scribner.....	1.25	1.09
*Meiklejohn, <i>The English Language, Its Grammar, History and Literature</i> , Heath.....	1.25	1.09
*Skeat, <i>A Concise Etymological Dictionary</i> , Claren- don.....	1.25	1.09
*Skeat, <i>Principles of English Etymology</i> , (2 vols.), Clarendon.....	4.85	4.29
*Toller, <i>History of English Language</i> , Macmillan..	1.10	.97
*Bates, <i>Talks on the Study of Literature</i> , Houghton	1.50	1.15
*Brink, <i>The Making of an Oration</i> , McClurg.....	1.50	1.12
*Bulfinch, <i>Age of Chivalry</i> , McKay.....	1.25	.80
*Corson, <i>Introduction to Shakespeare</i> , Heath.....	1.10	.86
*Dowden, <i>Shakespeare, His Mind and Art</i> , Harper	1.75	1.20
*Fairbanks, <i>Mythology of Greece and Rome</i> , Apple- ton.....	1.50	1.30
*Fairchild, <i>The Making of Poetry</i> , Putnam.....	1.50	1.30
*Gayley and Young, <i>English Poetry, Its Principles and Progress</i> , Macmillan.....	1.10	.97
*Jenks, <i>Lives of Great Writers Series</i> , (School Edi- tion), Barnes, each.....	.50	.44

In the Days of Chaucer.		
In the Days of Goldsmith.	List	Dist.
In the Days of Shakespeare.	Price.	Price.
*Jusserand, <i>English Wayfaring Life in the IV. Century</i> , Putnam.....	\$3.00	\$2.52
*Lathrop, <i>Where Shakespeare Set His Stage</i> , Pott..	2.00	1.72
*Matthews, <i>The Short Story</i> , Am. Bk. Co.....	1.00	.87
*Morley, <i>English Men of Letters Series</i> , Harper, each.....	.75	.49
Addison	Coleridge	Scott
Bacon	Dickens	Shelley
Burke	Goldsmith	Thackeray
Burns	Johnson	Wordsworth
Byron	Pope	
*Stedman, <i>American Anthology</i> , Houghton.....	2.00	1.73
*Stedman, <i>Victorian Anthology</i> , Houghton.....	1.75	1.51
*Tisdell, <i>Studies in Literature</i> , Macmillan.....	.90	.79
*Warner, <i>American Men of Letters Series</i> , Houghton, each.....	1.25	.95
Washington Irving.		
J. Fenimore Cooper.		
Ralph Waldo Emerson.		
Edgar Allen Poe.		
William Cullen Bryant.		
Nathaniel Hawthorne.		
Henry W. Longfellow.		
John Greenleaf Whittier.		
*Woodbridge, <i>The Drama, Its Laws and Technique</i> , Allyn and Bacon.....	.80	.69
*Addison, <i>Spectator</i> , Dutton.....	.40	.32
*Bacon, <i>Essays</i> , (E. L.), Dutton.....	.40	.32
*Bates, <i>A Ballad Book</i> , Sibley.....	.40	.36
*Bible, <i>Modern Reader's Bible</i> , Ed. by Monetou, Macmillan.....	2.00	1.62
*Browning, <i>Selected Poems</i> , Ed. by Burton, Heath	.60	.54
*Bryant, <i>Poetical Works</i> , (Household Ed.), Appleton.....	1.50	1.13
*Burns, <i>Poems, Songs and Letters</i> , (Globe Ed.), Macmillan.....	1.75	1.43
*Byron, <i>Poems</i> , (2 vols.), (Camelot Series), Scott	.80	.70
*Chaucer, <i>Canterbury Tales</i> , (E. L.), Dutton.....	.40	.32
*Clemens, (Mark Twain), <i>Adventures of Tom Sawyer</i> , Harper.....	1.75	1.16
*Coleridge, <i>The Golden Book of Coleridge</i> , (E. L.), Dutton.....	.40	.32
*Cook and Tinker, <i>Translations from Old English Poetry</i> , Ginn.....	1.00	.88
*De Foe, <i>Robinson Crusoe</i> , (E. L.), Dutton.....	.40	.32

	List Price.	Dist. Price.
*De Quincey, <i>Confessions of an English Opium Eater</i> , (E. L.), Dutton.....	\$.40	\$.32
*Dickens, <i>Novels</i> , (E. L.), Dutton, each.....	.40	.32
Christmas Stories.		
Nicholas Nickleby.		
Barnaby Rudge.		
Old Curiosity Shop.		
Oliver Twist.		
Pickwick Papers.		
*Evans (George Eliot), <i>Adam Bede</i> , (E. L.), Dutton.....	.40	.32
*Gaskell, <i>Cranford</i> , (E. L.), Dutton.....	.40	.32
*Howells, <i>A Hazard of New Fortunes</i> , Harper....	1.50	1.00
*Howells, <i>Heroines of Fiction</i> , (2 vols.), Harper..	3.75	2.88
*Howells, <i>My Mark Twain</i> , Harper.....	1.40	1.10
*Howells, <i>The Rise of Silas Lapham</i> , (Riv. Lit. Ser.), Houghton.....	.60	.50
*Irving, <i>The Alhambra</i> , Ginn.....	.40	.35
Irving, <i>Knickerbocker History of New York</i> , Burt	.75	.43
*Irving, <i>Life of Goldsmith</i> , Houghton.....	.50	.42
*Johnson, <i>Six Chief "Lives,"</i> Ed. by Arnold, Macmillan.....	1.25	1.11
*Kipling, <i>Departmental Ditties and Ballads and Barrack Room Ballads</i> , Doubleday.....	1.35	1.03
*Kipling, <i>Plain Tales from the Hills</i> , Doubleday..	1.35	1.03
*Kipling, <i>The Seven Seas</i> , Doubleday.....	1.50	1.15
*Lang, Leaf and Meyers, <i>Homer's Iliad</i>.....	.80	.70
*Longfellow, <i>Complete Poetical Works</i> (Household Ed.), Houghton.....	1.50	1.13
*Milton, <i>Poetical Works</i> , Ed. by Moody, (Student Ed.), Houghton.....	1.50	1.29
*Shelley, <i>Poems</i> , Ed. by Brooke, Macmillan.....	1.00	.80
*Stevenson, <i>The Amateur Emigrant and the Silverado Squatters</i> , Scribner.....	1.00	.73
*Stevenson, <i>Dr. Jekyll and Mr. Hyde</i> , Burt.....	.75	.43
*Stevenson, <i>Virginibus Puerisque</i> , Scribners.....	1.00	.73
*Thackeray, <i>Henry Esmond</i> , (E. L.), Dutton.....	.40	.32
*Whittier, <i>Complete Poetical Works</i> , (Household Ed.), Houghton.....	1.50	1.13
*Wordsworth, <i>Poetical Works</i> , (Globe Ed.), Macmillan.....	1.75	1.33
93 vols. (*) Books—Total cost (one copy of each)		\$73.05
143 vols. (**) and (*) Books—Total cost, (one copy each)		\$102.32
Abbott, <i>Shakespearean Grammar</i> , Macmillan....	1.50	1.32
Alden, <i>Introduction to the Study of Poetry</i> , Holt..	1.25	1.32
Bradley, <i>The Making of English</i> , Macmillan.....	1.00	.88

	List Price.	Dist. Price.
Bright and Miller, <i>Elements of English Versification</i> , Ginn.....	\$.80	\$.69
Jespersen, <i>Growth and Structure of the English Language</i> , Stechert.....	1.00	1.00
Johnson, <i>Forms of English Poetry</i> , Am. Bk. Co..	1.00	.87
Smith, <i>English Language</i> , Holt.....	.50	.43
Sweet, <i>New English Grammar</i> , (2 parts), Clarendon.....	3.50	3.00
Wyld, <i>The Growth of English</i> , Dutton.....	1.00	.86
Wyld, <i>Historical Study of the Mother Tongue</i> , Dutton.....	2.00	1.73
Adams, <i>Dictionary of American Authors</i> , Houghton.....	3.00	2.25
Bradley, <i>Shakespearean Tragedy</i> , Macmillan....	2.50	2.12
Bradley, <i>The Making of English</i> , Macmillan....	1.00	.88
Brooke, <i>English Literature from the Beginning of the Norman Conquest</i> , Macmillan.....	1.50	1.29
Cairns, <i>Early American Writers</i> , Macmillan....	1.25	1.11
Child, <i>Early Plays</i> , (Riv. Ser.), Houghton.....	.40	.34
Corson, <i>Introduction to the Study of Robert Browning</i> , Heath.....	1.10	.96
Crabbe, <i>English Synonyms</i> , Harper.....	1.25	.86
Cross, <i>Development of the English Novel</i> , Macmillan.....	1.50	1.25
Crawshaw, <i>The Making of English Literature</i> , Heath.....	1.30	1.14
Gosse, <i>History of Eighteenth Century Literature</i> , Macmillan.....	1.50	1.30
Jenks, <i>Lives of Great Writers Series</i> , (School Ed.), Barnes, each.....	.50	.44
In the Days of Milton.		
In the Days of Scott.		
Johnson, <i>Forms of English Poetry</i> , Am. Bk. Co..	1.00	.88
Minto, <i>Manual of English Prose Literature</i> , Ginn	1.50	1.32
Morley, <i>English Men of Letters Series</i> , Harper, each.....	.75	.49
Bunyan	De Foe	Spencer
Carlyle	De Quincey	Lamb
Chaucer	Gibbon	Locke
Cowper	Gray	Macaulay
Milton	Keats	
Newcomer, <i>Twelve Centuries of English Prose and Poetry</i> , Scott, Foresman.....	1.75	1.52
Pace, <i>American Literature with Readings</i> , Allyn and Bacon.....	1.35	1.18
Pollard, <i>English Miracle Plays</i> , Clarendon Press..	1.90	1.65
Raleigh, <i>Wordsworth</i> , Longmans.....	1.75	1.50

	List Price.	Dist. Price.
Rolfe, <i>Shakespeare, The Boy</i> , Harper.....	\$1.25	\$.94
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I. UNIVERSITY OF MISSOURI; COLLEGE OF AGRICULTURE.

(Address, Columbia, Missouri.)

The following publications were available for free distribution April, 1916:

Experiment Station Bulletins.

- 106 Co-Operative Experiments with Alfalfa.
- 108 Grass Investigations in the Ozark Upland.
- 112 Corn Silage for Fattening Two Year Old Steers.
- 114 Corn Versus Oats for Work Mules.
- 115 Rations for Fattening Western Yearling Sheep.
- 118 Drainage Investigations in Northeast Missouri.
- 119 Soil Investigations in Jasper County.
- 120 Rations for Breeding Ewes.
- 122 Inspection of Commercial Fertilizers, 1914.
- 123 Experiments with Farm Crops in Southwest Missouri.
- 125 Cost of Productions on Missouri Farms.
- 126 Soil Experiments in Northeast Missouri.
- 127 Soil Experiments in Central and Northeast Missouri.
- 128 Soil Experiments in North Missouri.
- 129 Soil Experiments on Red Limestone Upland of Southwest Missouri.
- 130 Soil Experiments on Gray Prairie of Southwest Missouri.
- 131 Work and Progress of Experiment Station, 1913-14.
- 132 The Control of the San Jose Scale in Missouri.
- 133 The Soil and Its Use.
- 134 Insect Pest of Field Crops.
- 135 Rations and Age at Calving as Factors Influencing Growth and Dairy Qualities of Cows.
- 136 Feeding Wheat to Fattened Swine.
- 137 The Periodical Cicada in Missouri.
- 138 Farm Bookkeeping.
- 139 Inspection of Commercial Fertilizers, 1915.

Experiment Station Circulars.

- 37 Variations in Cream Tests.
- 44 Feeding for Milk Production.
- 46 Factors Influencing the Yield of Oats.
- 57 Keeping Records of Dairy Cows.
- 64 Directions for Testing Cream.
- 65 Advantages from Use of Pure-bred Ram.
- 66 Cotton Seed Selection of Southeast Missouri.
- 67 How to Build a Gurler Silo.
- 68 The Seeding of Meadows and Pastures.
- 69 The Fertility of the Soil.
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- 78 The Control of Soil Washing.
- 79 Sour Milk for Chicken Feeding.
- 81 Pruning Shade Trees.

Extension Service Circulars.

- 2 Hairy Vetch for Missouri.
- 3 Growing Rape for Forage.
- 4 Controlling the Cinch-Bug.
- 5 Filling the Silo.
- 6 Growing Alfalfa in Missouri.
- 8 Judging of Chickens.

II. MISSOURI STATE BOARD OF AGRICULTURE.

(Address; Columbia, Missouri.)

- Missouri County Fairs. Vol. 10, No. 6.
- Potato Growing in Orrick District. Vol. 10, No. 9.
- Diversified Crops in Missouri. Vol. 10, No. 10.
- Bovine Tuberculosis. Vol. 10, No. 10.
- Crop Review for 1912. Vol. 10, No. 12.
- Country Hams and Bacon. Vol. 11, No. 6.
- Peach Growing, Koshkonong-Brandsville District. Vol. 11, No. 8.
- Home Economics Work in Missouri. Vol. 11, No. 11.
- Crop Review for 1913. Vol. 11, No. 12.
- Booklet: Missouri Peaches.
- Better Roads. Vol. 12, No. 10.
- Missouri Farmer's Ham and Bacon Show. Vol. 13, No. 3.
- Home Making in Missouri. Vol. 13, No. 4.
- Country Life Conference. Vol. 13, No. 5.
- Wheat Stacking. Vol. 13, No. 6.
- Alfalfa on Missouri Farms. Vol. 13, No. 8.
- Ice on the Farm. Vol. 13, No. 9.
- Some Insect Pests and Their Enemies. Vol. 13, No. 10.
- Dairy Laws, Rules, Regulations, Etc. Vol. 13, No. 11.
- Missouri Crop Review for 1915. Vol. 13, No. 12.
- Agricultural Exhibits and Farmers Institutes. Vol. 14, No. 1.

III. MISSOURI STATE BOARD OF HORTICULTURE.

(Address; Columbia, Missouri.)

Owing to the fact that the last legislature appropriated no funds for the maintenance of the Board of Horticulture, the Board has no funds for mailing. High schools desiring bulletins listed below *should remit postage for mailing.*

- 1 Home Manufacture of Cider Vinegar.
- 7 Practical School Gardening.
- 9 Manufacture, Preservation and Uses of Unfermented Grape Juice.
- 12 Marketing Fruits.
- 14 Poisonous and Medical Plants of Missouri.
- 16 What to do for the Curculio.
- 18 Civic Improvement for Town and Country.
- 19 Carload Pre-cooling of Fruits and Vegetables before Shipping.
- 20 Adaptability of the Ingram Apple to the Soils of the Ozarks.
- 24 Secretary's Report for the Year 1910.
- 25 Strawberry Congress.
- 27 Western Orchard Methods Applied to Missouri Conditions.
- 28 Summer Apples.
- 29 Are the Springs Colder Now?
- 30 Some Physiological Facts in Strawberry Growing.

- 32 Hints on Pruning Apple Trees.
- 33 Plant Propagation.
- 34 Asparagus and Rhubarb Culture.
- 35 * The Time for Planting Vegetables.
- 36 Growing Cucurbits. (Cucumbers, Cantaloupes, Melons).
- 37 Sweet Potato Growing.
- 38 Celery Growing.
- 39 Raspberry Culture.
- 40 The Pecan.
- 41 Insect Enemies of Ornamentals.
- 42 Bees and Horticulture.
- 43 Missouri State Board of Horticulture Mailing List.
- 44 Co-operation Among Fruit Growers.
- 46 Lime Sulphur Sprays.
- 47 Grading and Packing Fruit.
- 49 The Conservation of Soil Fertility.
- 50 Pruning Apple Trees, With Some Notes on Their General Care.
- 56 Native and Naturalized Plants of Missouri Suitable for Ornamental Planting.
- 58 Strawberry Congress.
- 60 Ornamental Planting.
- 61 Economic Value of Birds in Horticulture.
- 62 Planting and Care of the Young Orchard.
- 63 Vegetable Growing in Missouri.
- 64 Grape Growing.
- 65 Spray Machinery.

IV. UNITED STATES DEPARTMENT OF AGRICULTURE.

A great number of valuable bulletins for agriculture and domestic arts may be secured from the United States Department of Agriculture. The list of bulletins is too long to incorporate it in this course. Write to the U. S. Department of Agriculture, Division of Publications, Jos. A. Arnold, Editor and Chief, for a list of bulletins for free distribution.

Farmers' bulletins no longer for free distribution may be secured from the U. S. Department of Agriculture at a cost of 5 cents to 25 cents per bulletin or circular. Write to the Superintendent of Documents, Washington, D. C., for the price list of Farmers' Bulletins. This price list will be sent free on application.

PUBLISHING COMPANIES.

Below are given the addresses of the publishers most frequently quoted in the foregoing lists. Companies usually furnish their own publications to boards of education at slightly lower (wholesale) prices than can be secured from book jobbing houses, and when many books of one publisher are purchased at once a saving is made by ordering direct. All miscellaneous orders should be sent to the Missouri Store Co. as this company is prepared to supply promptly the books of all publishers. In ordering **state exactly what is wanted**, including author, title, edition and publisher. This precaution is doubly important when purchasing through local dealers not accustomed to handling orders of library books.

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| Allyn & Bacon, Chicago. | A. C. McClurg & Co., Chicago. |
| American Book Company, Chicago. | The Macmillan Company, Chicago. |
| D. Appleton & Co., Chicago. | Manual Arts Press, Peoria. |
| Atkinson, Mentzer & Co., Chicago. | Charles E. Merrill Co., Chicago. |
| Century Book Company, Chicago. | A. J. Nystrom & Co., Chicago. |
| Dodd, Mead & Co., Kansas City. | Open Court Publishing Co., Chicago. |
| Doubleday, Page & Co., New York City. | Orange, Judd Company, Chicago. |
| E. P. Dutton & Co., Indianapolis. | G. P. Putnam's Sons, Chicago. |
| Ginn & Co., Chicago. | Rand, McNally & Co., Chicago. |
| Harper & Bros., New York City. | Row, Peterson & Co., Chicago. |
| D. C. Heath & Co., Chicago. | Chas. Scribner's Sons, Chicago. |
| Henry Holt & Co., New York City. | Scott, Foresman & Co., Chicago. |
| Houghton, Mifflin Company, Chicago. | Silver, Burdett & Co., Chicago. |
| J. B. Lippincott Company, Philadelphia. | Small, Maynerd & Co., Boston. |
| Little, Brown & Co., Boston. | Webb Pub. Co., St. Paul. |
| Longmans, Green & Co., Chicago. | Whitcomb & Barrows, Boston. |
| | World Book Co., Yonkers, on the Hudson, N. Y. |

SYNOPSIS OF CONDITIONS UNDER WHICH STATE AID FOR HIGH SCHOOLS MAY BE OBTAINED.

The Wilson High School Aid Law.

To obtain aid under the Wilson Law a school district must meet the following conditions:

1. Make a levy of 100 cents on the \$100 for school purposes.
2. Maintain an average daily attendance of fifteen or more in high school the year previous to making application for state aid.
3. Maintain at least a two year approved high school.
4. Teach one year of approved work in agriculture.
5. Pay each of its teachers in both the elementary and high school at least \$40.00 per month.
6. Admit nonresident pupils on the payment of a reasonable tuition fee.
7. Be organized as a village, town or consolidated school district.

No district is entitled to aid in excess of one-half the total teachers' salaries paid for high school work the previous year.

The Buford Consolidation Law.

To obtain aid under the Buford Consolidation Law a district must meet the following conditions:

1. Be organized under the Buford Law.
2. Provide adequate school buildings. The high school cannot be conducted in a rented building, unless such arrangement is temporary and bonds have been voted for the erection of a high school building.
3. Maintain at least a two year approved high school.
4. Teach one year of approved work in agriculture.

No average daily attendance is specified in the Buford Law.

The amount of aid under the Buford Law is \$25.00 per square mile or fraction thereof in the area of the district, provided that no district can receive in any one year more than \$800.

The Crossley Teacher-Training Law.

To obtain aid under the Crossley Teacher-Training Law a school district must meet the following conditions:

1. Maintain a first class approved high school.
2. Employ in the high school five teachers, including the superintendent, except that the first school approved in any county may employ only four teachers in high school.
3. Maintain a class of ten in the teacher-training work.
4. Employ efficient teachers in the grades.
5. Provide suitable buildings and rooms for the regular high school work and a suitable room for the teacher-training work.
6. Employ for the teacher-training work a well trained and successful instructor, approved for this work.
7. Comply with all the special teacher-training requirements.

IMPORTANT SECTIONS OF THE SCHOOL LAWS RELATING TO HIGH SCHOOLS.

CLASSIFICATION OF HIGH SCHOOLS.

Classification of High Schools.

Sec. 10923. *Classification of high schools—work to be accredited.*—The state superintendent of public schools shall have authority to classify the public high schools in the state into first, second and third classes, and shall prescribe minimum courses of study for each class: *Provided*, that no school shall be classed as a high school of the first class which does not maintain a four years' course of standard work in English, mathematics, science and history for a term of at least nine months in the year, and which does not employ the entire time of at least three approved teachers in high school work; that no school shall be classed as a high school of the second class which does not maintain a three years' course of standard work in English, mathematics, science and history for a term of at least nine months in the year, and which does not employ the entire time of at least two approved teachers in high school work; that no school shall be classed as a high school of the third class which does not maintain a two years' course of standard work in English, mathematics, science and history for a term of at least eight months in the year, and which does not employ the entire time of at least one approved teacher in high school work. All work completed in an accredited high school shall be given full credit in requirements for entrance to and classification in any educational institution supported in whole or in part by state appropriations. (Laws 1903, p. 264, re-enacted, L. 1909, p. 770.)

High School Inspection.

Sec. 10924. *High school inspection by state superintendent.*—For the purpose of classifying high schools and having their work accredited by higher educational institutions, the state superintendent of public schools shall, in person or by deputy, inspect and examine any high school making application for classification, and he shall prescribe rules and regulations governing such inspections and examinations, and keep complete record of all inspections, examinations and recommendations made. He shall, from time to time, publish lists of classified high schools: *Provided*, he may drop any school in its classification if, on reinspection or re-examination, he finds that such school does not maintain the required standard of excellence. (Laws 1903, p. 265, re-enacted, L. 1909, p. 770.)

Qualifications for County Certificates.

Section 10941. *Qualifications necessary for certificates.*—No person shall be granted a license to teach in the public schools of this state who is not of good moral character. From and after September 1, 1912, all applicants for first or second grade certificates to teach must present evidence of having completed the first year's work of a classified or accredited high school as defined in section 10923, R. S. Mo. 1909, or its equivalent. From and after September 1, 1914, all applicants for first or second grade certificates must present evidence of having completed two years of such work, or its equivalent. From and after September 1, 1916, all applicants for first or second grade certificates must present evidence of having completed three years of such work, or its equivalent. From and after September 1, 1918, all applicants for first or second grade certificates must present evidence of having completed four years of such work, or its equivalent. "The high school work herein required may be done in any public, private, or parochial school, or private study, and satis-

factory evidence thereof presented by the written statements of parties who have personal knowledge that such work has been done, or by passing a satisfactory examination on the subjects for which credit is claimed and which are not required in the examination prescribed by section 10939 of this article:" *Provided*, that the provisions of this section shall not apply to any person who holds a certificate entitling him to teach in the schools of Missouri at the time of the taking effect of this act.

The Wilson High School Aid Law, 1913.

Section 1. *State aid for high schools, how received.*—Any town, city or consolidated school district may apply for state aid to maintain a high school. The aid granted shall be eight hundred dollars (\$800.00) per year to districts whose valuation is less than three hundred thousand dollars (\$300,000); six hundred dollars (\$600.00) per year to districts whose valuation is three hundred thousand dollars and less than four hundred thousand dollars (\$400,000); four hundred dollars (\$400.00) per year to districts whose valuation is four hundred thousand dollars and less than six hundred thousand dollars (\$600,000); two hundred dollars (\$200) per year to districts whose valuation is six hundred thousand dollars (\$600,000) or more: *Provided*, that a district in order to receive state aid shall show its assessed valuation, that it is organized as a town, city or consolidated school district and has six school directors, that it has levied for school purposes (teachers and incidental expenses) the maximum levy provided by law, that it maintains an approved high school and employs a competent principal to teach in said high school and to supervise the elementary school of said school district, that it pays each of its teachers at least forty dollars per month, that it admits non-resident pupils to said high school on payment of a reasonable tuition fee, that during the past year the daily attendance in said high school has averaged fifteen pupils, that it gives an approved course of at least one year in agriculture: *Provided further*, that in no case shall any district receive from the state in any year more than one-half of the amount of the salary paid to its high school teachers the previous year. It is also further provided that no district receiving any other form of special high school aid from the state shall be entitled to aid under this act.

Sec. 2. *Provisions under which aid may be had.*—Any town, city or consolidated school district, situated in any county in which there is no school district whose assessed valuation is more than three hundred thousand dollars (\$300,000) may apply for state aid to maintain a high school. A district making application for state aid under this section shall show that it has an assessed valuation of less than three hundred thousand dollars, and that no approved high school in the county maintains an average daily attendance of fifteen pupils, that it is organized as a town, city or consolidated school district and has six school directors, that it has levied for school purposes (teachers and incidental expenses) the maximum levy provided by law, that it proposes to maintain an approved high school of at least the third class for a term of eight months and that it employs a competent principal to teach in said high school and supervise the elementary school of said district. The state hereby grants an aid of eight hundred dollars (\$800.00) per year to such school district. But it is further provided that, if two or more districts in the same county apply for state aid under the provisions of section 2 of this act, the district that first files in the office of the state superintendent of public schools notice of its intention to apply for aid under this act shall be granted the aid: *Provided*, that on or before June 30th, following the filing of the notice of its intention to apply for aid, it shows that it has met the requirements of this section: *Provided further*, that any district receiving aid in any year shall be regarded as the first applicant for aid the succeeding year without the filing of a formal notice. It is further provided that any school district receiving aid under the provisions of this act shall admit non-residents pupils to the high school of said district on the payment of a reasonable tuition fee. *Provided further*, that any school district receiving state aid for two consecutive years and then during any two consecutive years thereafter fails to maintain an average daily attendance of fifteen high school pupils, shall forfeit its right to

any further aid for a period of five years, or until it can again show an average daily attendance of fifteen high school pupils for a term of eight months.

Sec. 3. *Board of directors to make statement of amount of aid entitled to—county clerk to certify list—duties of state superintendent.*—The board of directors of any school district desiring to avail itself of the state aid provided for under this act shall meet and on or before June 30th furnish to the county clerk evidence that their school district has met the requirements of this act, and shall make a statement of the amount of aid to which said district is entitled. This evidence and statement shall be attested by the signatures of the president and the clerk of said school board and sworn to before a notary public or the county clerk. It shall be the duty of the county clerk on or before July 15th to furnish to the state superintendent of public schools a list of all the districts in his county making application for state aid for high schools, showing the amount estimated for each school district and the total amount for the county. Before apportioning the state school funds, the state superintendent shall set aside a sum equal to the total of all the applications for state aid called for by all the counties of the state, after which he shall proceed in accordance with section 10822 of the Revised Statutes of Missouri, 1909, and of the session acts of 1911: *Provided*, that the amount so set aside shall in no one year exceed five per cent. of the total state school funds. Should the total application[s] for aid called for by all the counties in any one year exceed five per cent. of the total state school funds, then the state superintendent of public schools shall first set aside out of the five per cent. the amount of aid applied for under section 2 of this act, and then the remainder of the five per cent. of said state school funds shall be distributed pro rata among the districts applying for aid under section 1 of this act, according to the amount applied for by each district. The state superintendent of public schools shall within thirty days after he has approved the work of any school applying for aid certify his approval to the state auditor, who shall draw a warrant on the state treasurer for the amount due such district and forward said amount to the county clerk of the proper county, and the county clerk shall thereupon apportion the said amount to the proper district in accordance with the application on file in his office.

For synopsis of conditions for state aid under this law, see page 167.

The Buford Consolidation Law, 1913.

Section 1. *Consolidated district for elementary and high school may be formed.*—The qualified voters of any community in Missouri may organize a consolidated school district for the purpose of maintaining both elementary schools and a high school as hereinafter provided. When such new district is formed it shall be known as consolidated district No. ofcounty, and all the laws applicable to the organization and government of town and city school districts as provided in article IV, chapter 106 of the Revised Statutes of Missouri, 1909, shall be applicable to districts organized under the provisions of this act.

Sec. 2. *Consolidated district—area and enumeration of.*—No consolidated district shall be formed under the provisions of this act unless it contains an area of at least twelve square miles or has an enumeration of at least two hundred children of school age: *Provided*, that no district formed under the provisions of this act shall include within its territory any town or city district that at the time of the formation of said consolidated district has by the last enumeration two hundred children of school age.

A consolidated school district must either contain an area of twelve square miles or have an enumeration of two hundred children of school age.

Sec. 3. *Petition to form consolidated district filed with whom—duties of county school superintendent—meeting—organization of.*—When the resident citizens of any community desire to form a consolidated district, a petition signed by at least twenty-five qualified voters of said community shall be filed with the county superintendent of public schools. On receipt of said petition, it shall be the duty of the county superintendent to visit said community and investigate the needs of the community and determine the exact boundaries of the proposed consolidated district. In determining these boundaries, he shall so locate

the boundary lines as will in his judgment form the best possible consolidated district, having due regard also to the welfare of adjoining districts. The county superintendent of schools shall call a special meeting of all the qualified voters of the proposed consolidated district for considering the question of consolidation. He shall make this call by posting within the proposed district ten notices in public places, stating the place, time and purpose of such meeting. At least fifteen days' notice shall be given and the meeting shall commence at 2 o'clock p. m. on the date set. The county superintendent shall also post within said proposed district five plats of the proposed consolidated district at least fifteen days prior to the date of the special meeting. These plats and notices shall be posted within thirty days after the filing of the petition. The county superintendent shall file a copy of the petition and of the plat with the county clerk and shall send or take one plat to the special meeting. The special meeting shall be called to order by the county superintendent of schools or some one deputed by him to call said meeting to order. The meeting shall then elect a chairman and a secretary and proceed in accordance with section 10865, R. S. 1909. The proceedings of this meeting shall be certified by the chairman and secretary to the county clerk or clerks and also to the county superintendent or superintendents of schools of all the counties affected. If the proposed consolidated district includes territory lying in two or more counties, the petition herein provided for shall be filed with the county superintendent of that county in which the majority of the petitioners reside. The county superintendent shall proceed as above set forth and in addition shall file a copy of the petition and of the plat with the county clerk of each county from which territory is proposed to be taken.

Sec. 4. *Transportation—may be voted on.*—The question of transportation of pupils may be voted upon at a special meeting above provided for, if notice is given that such a vote will be taken. If transportation is not provided for in any school district formed under the provisions of this act, it shall then be the duty of the board of directors to maintain an elementary school within two and one-half miles by the nearest traveled road of the home of every child of school age within said school district: *Provided further*, that if transportation is not provided for, any consolidated district may by a majority vote at any annual or special meeting decide to have all the seventh grade and the eighth grade work done at the central high school building, provided fifteen days' notice has been given that such vote will be taken. Such seventh and eighth grade work at the central school may be discontinued at any time by a majority vote taken at any annual or special meeting.

It requires that two-thirds ($\frac{2}{3}$) of the voters who are taxpayers voting at the election vote in favor of transportation in order to authorize the board of directors to provide transportation.

A taxpayer is one who owns property subject to taxation.

Sec. 5. *Parts of districts remaining after consolidation—procedure.*—Whenever by reason of the formation of any consolidated school district a portion of the territory of any school district has been incorporated in the consolidated district, the inhabitants of the remaining parts of the district shall proceed in accordance with section 10822, providing for the annexation to city school districts, and the consolidated district shall be governed by the same provisions as govern city school districts in such cases. The inhabitants of the remaining parts of the districts may also annex themselves to any other adjoining district or districts by filing a petition asking to be so annexed with the clerk or clerks of the district or districts to which they desire to be annexed and by also filing a copy of all such petitions with the clerk of the county court.

Sec. 6. *Settlement of property—original districts to continue—how long.*—Whenever any consolidated district is organized under the provisions of this act, the original districts shall continue until June 30th, following the organization of said consolidated district, and at that time all the property, money on hand, books and papers of the school districts whose schoolhouse sites are included within said consolidated district shall by the officers of aforesaid districts be turned over to the board of directors of the consolidated district, and also all bonds outstanding against the aforesaid districts shall become debts against the consolidated district. The division of property and money

on hand in case school districts are divided by the formation of any consolidated district shall be governed by sections 10839 and 10840.

Sec. 7. *State aid—when granted—how.*—Whenever a district organized under the provisions of this act has secured a site of not less than five acres for the central high school building of said district and has erected thereon a school building, suitable for a central school and containing one large assembly room for the meeting of the citizens of the district and has installed a modern system of heating and ventilating, the state shall pay one-fourth of the cost of said building and equipment, provided the amount thus paid by the state shall not exceed two thousand dollars (\$2,000.00) for any one district. The state of Missouri shall out of the general revenue fund of the state make adequate appropriation for carrying out the provisions of this section and the money due any district shall be remitted by the auditor to the county treasurer of the proper county on receipt of a certificate from the state superintendent of public schools stating that the conditions herein prescribed have been complied with.

Sec. 8. *Special state aid granted—when—how.*—When a consolidated district has been organized as herein provided and has provided adequate buildings for school purposes, the state shall grant a special aid of twenty-five dollars (\$25.00) per year for each square mile or fraction thereof in the area of said district: *Provided*, the district maintains an approved high school of at least the third class and gives an approved course of at least one year in agriculture; *and provided further*, that no district shall receive more than eight hundred dollars per year under the provisions of this section. The state of Missouri shall out of the general revenue fund of the state make adequate appropriation for carrying out the provisions of this section. The money herein provided shall become due on June 30th of each year, and the district clerk shall on or before June 30th make application to the county clerk for the aid due his district and the county clerk shall certify these applications to the state superintendent of public schools, who shall approve them and certify to the state auditor the amount due each district under the provisions of this act. The state auditor shall draw his warrant on the state treasurer for the said amount and remit to the treasurer of the proper county.

For synopsis of conditions for state aid under this law, see page 167.

The Crossley Teacher-Training Course Law, 1913.

Section 1. *Teacher-training courses—provisions for—what grades.*—For the purpose of increasing the facilities for training teachers for the elementary and rural public schools, by requiring a review of such common branches as may be deemed essential by the state superintendent of public schools and for instruction in elementary pedagogy, including the art of teaching elementary agriculture, provision is hereby made for teacher-training courses in the eleventh and twelfth grades of such approved first class high schools as the state superintendent of public schools may designate: *Provided*, that such high schools shall be selected and distributed with regard to their usefulness in supplying trained teachers for the elementary schools of all portions of the state and with regard to the number of teachers required for the elementary schools in each portion of the state: *Provided*, that private and denominational schools be eligible to the provisions of this act, except as to receiving state aid.

Sec. 2. *State aid—amount of—payable how—superintendent to make report—auditor to send amount to county clerk.*—Each public high school approved under the provisions of this act shall receive state aid to the amount of seven hundred and fifty dollars (\$750.00) per annum, payable in two equal installments at the close of each semester as hereinafter provided. The superintendent of each such approved high school shall at the close of each semester file such report with the state superintendent of public schools as said officer may require. Upon receipt of a satisfactory report the state superintendent of public schools shall certify to the state auditor the amount due said school and the county in which said school is situated, and shall also notify the county clerk of each county the amount due any school in his county. The state auditor shall draw a warrant on the state treasurer for the amount due such

district and forward said amount to the county clerk of the proper county and the county clerk shall thereupon apportion said amount to the proper district.

Sec. 3. *State aid—when more than one high school—requirements for.*—It is provided that in case more than one high school in any county shall be approved under the provisions of this act the total state aid distributed in such county shall not exceed twelve hundred dollars (\$1,200.00), to be divided equally among said high schools. No high school shall be approved as entitled to state aid unless a class of ten or more shall have been organized, maintained and instructed during the preceding semester in accordance with the provisions of this act and the regulations of the state superintendent of public schools.

Sec. 4. *Inspector of teacher-training—appointment of—salary.*—The appropriation provided for by this act for the instruction of pupils in the science and practice of rural school teaching and the teaching of elementary agriculture may be expended in part for the inspection and supervision of such instruction by the state superintendent of public schools and by such person as he may designate, and the expense of such inspection and supervision shall be paid out of said appropriation on vouchers certified by the state superintendent of public schools. In accordance with the foregoing provisions of this section, the state superintendent of public schools is authorized to appoint an inspector of teacher-training in high schools and private and denominational schools at a salary of not to exceed two thousand two hundred dollars (\$2,200.00) per year, and the necessary traveling expenses while in the discharge of his duties.

Sec. 5. *State school superintendent—duty of—teacher-training classes.*—The state superintendent of public schools shall prescribe the conditions of admission to the teacher-training classes, the courses of instruction, the rules and regulations under which such instruction shall be given and the requirements for graduation subject to the provisions of this act.

Sec. 6. *Examination for graduation—fee for certificate—apportionment of fee—account to be kept by state school superintendent.*—In each high school approved under this act, an examination for graduation from the teacher-training course shall be conducted under such rules as the state superintendent of public schools shall prescribe. Each applicant for such certificate of graduation shall pay a fee of three dollars (\$3.00) to the superintendent of schools of the county in which said applicant is attending high school. One dollar of said fee shall be sent by said county superintendent to the state superintendent of public schools, to be used to pay the cost of reading and grading the answer papers of such applicants and other expenses incident to such examinations, one dollar shall be used for the payment of the expenses of teachers' associations, and one dollar shall be retained by the county superintendent for compensation for such work as the state superintendent of public schools may require of him in connection with teacher-training courses. The state superintendent of public schools shall keep an accurate account of all moneys received and disbursed by him in carrying out the provisions of this act. Any balance remaining in said fund shall be turned into the general revenue fund of the state by the state superintendent of public schools on the first day of September of each calendar year.

Sec. 7. *Certificate of graduation—issued by whom—grades—fee.*—A certificate of graduation from the teacher-training course provided for in this act shall be issued by the state superintendent of public schools and shall be a valid license to teach in any public elementary or rural school in any county of the state for a term of two years on registration with the superintendent of schools of the county in which the applicant is employed to teach. After thirty-two weeks of successful experience and one term's successful work in a state normal school, in the state university, or in any standard college or university, any person holding a teacher-training certificate issued under the provisions of this act shall receive a first grade county certificate. On request of the superintendent of schools of the county under whose supervision the applicant may have taught, accompanied by a statement that the applicant has been successful as a teacher and by a certificate showing that the work prescribed above has been done, the state superintendent of public schools

shall certify to the county superintendent the grades made by said applicant, and upon these grades a first grade certificate shall be issued to the applicant by the county superintendent on the payment of a fee of one dollar and fifty cents.

One hundred and sixty thousand dollars (\$160,000) was appropriated for teacher-training courses for the biennial period ending December 31, 1916.

Ninety-eight (98) first class high schools and three (3) fully accredited private academies maintained teacher-training courses during the school year 1915-1916.

For synopsis of conditions for state aid under this law, see page 168.

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